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Editorial Notes

DR C. L. WOOLLEY'S article in the present issue will serve to call attention to an archaeological scandal. Ever since he first discovered an important gold object in 1927 the Arabic Press of Iraq, by innuendo and direct statements, has persuaded people in Baghdad and elsewhere that their country, with the connivance of the Director of Antiquities, was being robbed of its antiquities by excavators. This propaganda has been generally accepted by officials who ought to know much better ; and men in high political positions in Iraq have been heard to accuse the British of retaining gold objects which were actually on exhibition in the Baghdad Museum.

During the years 1932–1933 a personal campaign has been conducted against the present Director of Antiquities and the staffs of Foreign Expeditions for unworthy, probably personal, motives. This campaign has been ignored as it deserves to be ; but it is now time that the Administration of Antiquities, set up by Miss Gertrude Bell under the British Mandate, and the conduct of the recent Directors of Antiquities, should be justified. Dr Woolley's statement will convince

archaeologists that the excavations at Ur have enriched the Iraqi nation by securing for it, with all the aid that modern science can afford, a very valuable collection of antiquities, more than equal to the collections from Ur in the British Museum and the University Museum of Pennsylvania at Philadelphia put together.

The sooner political propaganda against archaeological work by foreigners in Iraq is dropped, the sooner scholars will be able to feel some confidence in the measures at present being taken in that country. The present trend of events can only lead disinterested observers to believe that irreparable harm is being done by a policy which discourages and penalizes scientific expeditions without providing efficient means to prevent wholesale spoliation and destruction of ancient sites. The threat of various new laws has been disturbing. If a new law is introduced next year on the lines apparently proposed, the Iraq Government will have placed itself in the position of stopping work by others, while itself unable to prosecute research.

With the publication of this number we welcome the accession of a group of new readers in the United States of America. We welcome them most heartily. Already for several decades American and British institutions and individuals have been engaged upon joint undertakings throughout the world, particularly in the East. Ur was excavated by just such a joint expedition, and several others are still in the field. Such cooperation is characteristic of all live science, but the effects are often limited, of necessity, to the few persons directly concerned.

It has been one of the tasks of ANTIQUITY to interpret to a wider public the meaning of the epoch-making discoveries so made. For without the cooperation of the public, archaeology as it exists today could not continue—a fact liable to be forgotten by specialists when in full cry ! It is obviously therefore in the interests of all concerned that some one should broadcast the chief items of news in language as

plain as the subject permits. We have attempted to do this in the past and we shall continue to do so, encouraged by the knowledge that our efforts are appreciated in at least two Continents. There will of course be no change of policy where none is needed ; we shall merely try and do better what we have hitherto been doing, and perhaps cast our nets even more widely than before, particularly in eastern waters.

Amongst undertakings which (so far as staff is concerned) may well be called international, are the various expeditions of the Oriental Institute of Chicago University, which is doing magnificent work throughout the whole of the Middle East, under the direction and personal inspiration of Dr J. H. Breasted.* The major results obtained are already fairly well known, and as publication proceeds they will become even better known. Amongst the recent publications of the Institute are some (vols. x, 1929 ; xvii, 1933 ; xviii, 1934) which deal with the late Tertiary and Quaternary Deposits of Egypt, with special reference to the antiquity of man. Dr K. S. Sandford has been studying these deposits since 1926, when Dr Breasted provided the organization required to ensure that a comprehensive survey, extending over a period of years, should be carried out. Details of the work done between Cairo and the Second Cataract are now available, and considerable progress has been made between Dongola and Berber. Palaeolithic implements have been found in geologically dated strata, and there is much evidence of progressive desiccation. Further volumes in the series will be awaited with interest.

We conclude with a word to our ' constant readers '. We are engaging in a publicity campaign to secure fresh subscribers, for even after eight years of effort there must remain quite a few people who are not yet aware of the existence of Antiquity. We are therefore posting to several thousand members of various Societies in this country and abroad leaflets similar to those by which Antiquity was established.

* The value of the work of The Oriental Institute generally is also emphasized by the Review on page 109.

It is quite certain that some of those who already subscribe will receive leaflets, for the process of elimination of names to avoid this is impossible, and indeed the labour would be out of all proportion to the results. We therefore ask them, if they receive leaflets, to send them to friends who may be interested and thereby help the campaign, or to ignore them.

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PLATE II

THE PYRAMIDS AT GIZA, FROM THE AIR (*See* p. 8)

Pyramids and their Purpose

by Noel F. Wheeler

THE main object of these articles is to examine the evidence on the subject of Pyramids in general and the Great Pyramid of Khufu (Cheops) in particular; and to see if a reasonable conclusion can be reached as to the purpose for which the Great Pyramid was erected.

It is necessary to do this because the general reader is often at the mercy of what he reads, and unable without some guidance to distinguish between journalistic rubbish and scientific statements. He is apt to judge the importance of a document rather by the forcefulness of its dogmatism, the extent of its publicity, or the 'interest' of its theories, than by the scientific value of its content; and while there are some publications dealing with the Great Pyramid which are worth reading, there are many which are not, though they attract much more attention. After reading these articles the reader will be in a position to decide for himself whether he should accept without question the wild and fantastic theories current, or whether he should keep to ordinary commonsense and archaeological evidence.

In order to provide a background to the subject, I propose to discuss first the Pyramid Age and to consider for a moment what sort of people were the Egyptians of that time. After that (in a second article) I shall describe the Great Pyramid in some detail, in the light of recent excavations around it, and try to arrive at a commonsense solution of its many problems. Finally (in my third article) I shall touch briefly on some of the wilder theories, but shall treat them no more seriously than they deserve.

The Pyramid Age

What is usually described as the Pyramid Age is the period of the third, fourth, fifth and sixth dynasties, covering approximately 500 years in time from 3000 to 2500 B.C. The actual dates attributed by

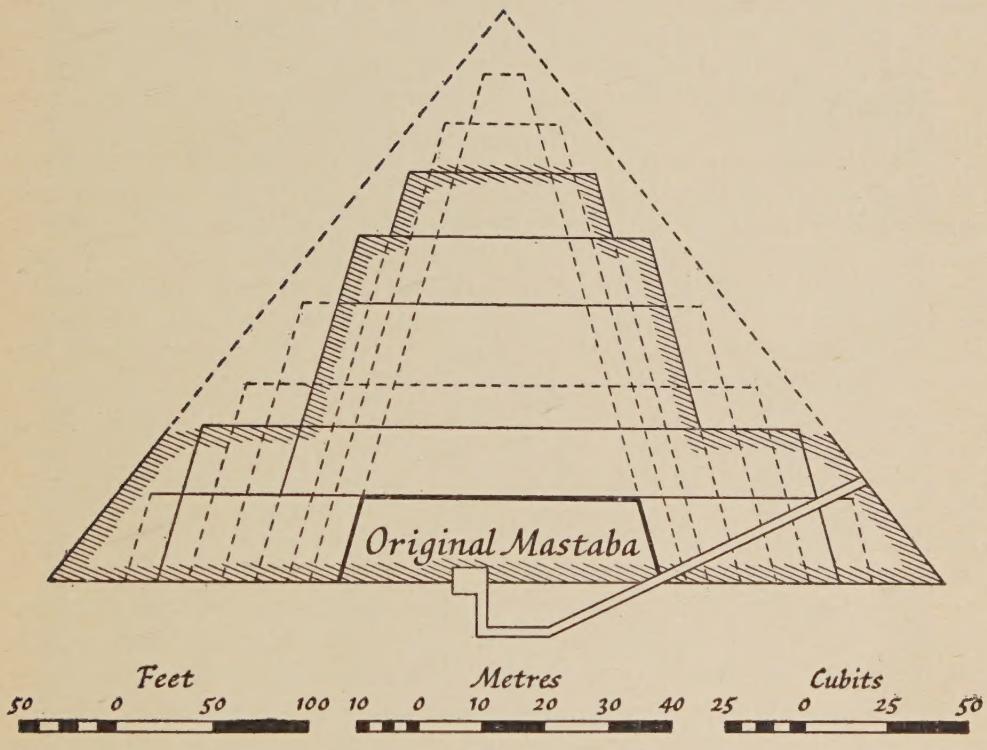
different writers to the kings of this period vary so much that their only significance in the present connexion is relative. The initial date of 3000 B.C. may well be as much as 100 years out in either direction; and it is not until one comes to the next period, the Middle Kingdom, about 2000 B.C., that dates can be fixed with any degree of certainty.

The third dynasty, which began and ended around 3000–2900 B.C., included the well-known king Zoser (variously written Thoser, Zeser, etc.), who was the builder of the step-pyramid at Sakkara (where the Egyptian Government has excavated during recent years some of the most interesting architectural works ever found in Egypt); and king Huni (Nefer-ka-Re Huni), the presumed father of the great king Seneferu who began the fourth dynasty. Seneferu may be met with in various writings as Snofru, Snefru, Seneferuw, Soris (Manetho), and other versions even further from his true name which is in the hieroglyphic ' S-nfr-w '. During the fourth dynasty, which begins with Seneferu, there were the Pyramid kings of Giza—Khufu (Cheops, Sufis, Khnum-Khufu, etc.); Re-dedef (Rhatioses, Dedefre, etc.); Khafré (Sufis, Chephren, etc.); Menkauré (Menkheres, Mykerinos, etc.); and Shepses-kaf (Bikheris, etc.).

The fifth dynasty includes the Pyramid kings of Abusir—User-kaf (Userkheres, Weser-kaf, etc.); Sahuré (Sefres); Nefer-ir-ka-ré (Neferkheres, etc.); Nefer-ef-ré (Kheres, etc.); Ne-user-ré (Rhathures, Ra-en-user, etc.); Isesy (Ded-ka-re Assa, Tankheres, Isosy, etc.); and Unas (Wenis, Onnos, Unnos, etc.). Among the kings of the Sakkara Pyramids (sixth dynasty) were Tety (Teta, Othoes, etc.); User-ka-re; Mery-Re Pepy (Fiops, Pepy I); Merenre (Methusufis, etc.); Nefer-ka-re Pepy (Pepy II, Fiops, etc.); Merenre II.

The type of royal tomb in vogue before the introduction of the pyramid was the mastaba—a rectangular structure of masonry whose length was usually a little more than twice the breadth, flat-topped, and with the outer faces rising at a slope of about 7 to 14 on one. (The actual angles of slope at Giza vary from 74° 4′ to 80° 57′). The mastaba tomb continued in use alongside the later pyramid throughout the Pyramid Age, and varied in size from the very small mud-brick mastabas of the poorer people, a few feet square, to the large royal mastabas at Giza, of which the largest has a length nearly one half of the side of the Great Pyramid. (See FIGURE opposite).

During the third dynasty the pyramid idea began to develop out of a series of superimposed ' mastabas '; and the step-pyramid of Zoser at Sakkara, the step-pyramid at Meydum, a pyramid at Zawiet-el-Aryan



SECTION OF THE PYRAMID OF MEYDUM, SHOWING DEVELOPMENT FROM ORIGINAL MASTABA
PRESENT OUTLINE SHADED
(Petrie, ' History of Egypt ' vol. 1)

possibly of king Kha-ba and possibly a step-pyramid (between Giza and Abusir), and an unfinished pyramid at the same place possibly of king Neb-ka, all belong to this transitional period. Together with the pyramids of Seneferu and Huni (?) at Dahshur (south of Sakkara) and at Meydum (further south), none of these were true pyramids, but merely structures of a generally pyramidal form consisting of superimposed mastabas, which gave the appearance of steps. The slope of the faces of these steps was approximately that of the normal mastaba, and the whole was cased in fine limestone, still keeping the step form.

The first true pyramid, designed as such from the beginning, was that built by Khufu at Giza, known as the Great Pyramid (PLATE II). The other pyramids at Giza, and all subsequent pyramids not only at Giza, but at Sakkara and Abusir of the fifth and sixth dynasties, and of later periods at Dahshur, Lahun, Lisht, Hawara, Gurnah, Abydos and in the Sudan, were all true pyramids in the same sense and presumably directly descended from the Great Pyramid. The largest of all these, and the finest in workmanship, was the Great Pyramid, with a base side of 440 Egyptian cubits. With the exception of the Second Pyramid at Giza (of Khafre), and of two of the Dahshur pyramids, all the others are of much smaller dimensions. Confining ourselves to the true Pyramid Age the smallest recorded is that of Sahure's Queen at Abusir, which has a base side of only 30 cubits. The value of this cubit, and other matters concerning units of measurement will be considered in more detail later. (1 cubit = 20.59 inches or 52.3 cms.).

The publications on the subject of the Great Pyramid have been so numerous and so widely read that the non-archaeological reader might well forget that, besides the other Giza pyramids, there are a vast number of pyramids in Egypt alone—not to mention those in the Sudan. In order to give a clearer idea of them as a whole a list is given in the appendix (pp. 15–21), numbered consecutively, and it is by these numbers that they are referred to in the text.

It will be seen from the list that the first pyramids were built at Sakkara and Meydum, with two exceptions at Zawiet-el-Aryan—a few miles south of Giza. The change of site to Giza was made by Khufu, and he was followed there by the remainder of his dynasty, except Dedefre, who for some unknown reason went ten miles further north to Abu Roash for his pyramid. The fifth dynasty again shifted to Sakkara and Abusir, a few miles north of Sakkara ; the eleventh dynasty moved up to Gurnah in Upper Egypt ; the twelfth returned

AN UNDISTURBED BURIAL OF THE PYRAMID AGE. (*See* p. 9)
The stone-slab lid of the rock-cut sarcophagus, the offering-jars, and the alabaster jars behind, are still in place

THE ALABASTER SARCOPHAGUS OF HETEP-HERES, MOTHER OF KHUFU (CHEOPS) CASED IN WOOD COMING OUT OF HER TOMB. (*See* p. 12)
Dr Reisner is standing at the right hand of the derrick

SOLID GOLD HIEROGLYPHS SET IN EBONY STRIPS ON THE BACK OF THE CARRYING-CHAIR OF HETEP-HERES, MOTHER OF KHUFU (CHEOPS), CAIRO MUSEUM. (*See* p. 12)

PLATE VI

ONE OF THE SLATE TRIADS SHOWING MENKAURÉ WITH HATHOR AND THE GODDESS OF THE JACKAL - NOMES, CAIRO MUSEUM.
(See p. 13).

Service des Antiquités, Cairo

north to Lisht, Dahshur, Lahun and Hawara—none of them very far south of Sakkara, the farthest being about forty miles.

In addition to Egyptian pyramids, there were Roman pyramids, the Pyramid of Cestius at Rome being 116 feet high ; the pyramidal mounds of early Chinese emperors ; and many ' freak ' pyramids all over the world. Copernicus built one over a well at his house in Frauenburg near the mouth of the Vistula. There is one, of very small dimensions, in the Dean cemetery, Edinburgh. The pyramidal temples in America, which have been often described as pyramids, belong to quite a different family from the Egyptian Pyramids : they are stepped, have a very shallow slope, and were surmounted by a temple—showing that their purpose was entirely different. The Egyptian pyramid was essentially the superstructure of a tomb, which was nearly always cut in the rock beneath, the entrance being in one face of the pyramid or in the rock outside it (PLATE III).

There may have been other pyramids at Abusir, Abu Roash, and at Gurnah, all trace of which has now gone. Either they are buried under débris in unexcavated areas, or they have been razed to the ground by plunderers and the elements.

It is possible to get very close to an understanding of the people of the Pyramid Age ; but to do so one must see such of their handiwork as remains to us, scattered through the museums of the world, and study the literature of the subject. In order to familiarize oneself with their handiwork there is no better method than to spend a long period on the site of their activities.

Egyptian craftsmanship had been developing rapidly from the time of the first dynasty, with a leap to stone building at Sakkara in the third ; and it reached its zenith in the fourth and fifth ; in the sixth dynasty the first signs of retrogression appear. Of Egyptian art at its zenith the late Mr Arthur Weigall says ' [it] had now reached a level which, in certain respects, can hardly be said ever to have been excelled in that country. . . .' (*Ancient Egypt*, Benn, 1928). Petrie, in *Revolutions of Civilisation* (Harper, 1922), describes the art of Seneferu as ' almost perfect '. Referring to architecture, sculpture and painting, Terence Gray writes in his chapter on Khafré in Mrs Brunton's *Kings and Queens of Ancient Egypt* (Hodder and Stoughton, 1924), ' Under Khafré these things, evolving uncertainly during the preceding centuries, burst suddenly into a glorious first blossoming whose virile simplicity and primitive untrammelled inspiration have

left them from the lifetime of Khafré until today among mankind's most masterly artistic achievements '. Concerning their literature we read in Professor Blackman's translation of the *Literature of the Ancient Egyptians of Erman* (Methuen, 1927), ' As far back as we can trace it, the Egyptian language displays signs of being carefully fostered. It is rich in metaphors and figures of speech, a " cultured language " which " composes and thinks " for the person who writes. One at least of the old books of proverbs may even have been composed during the Old Kingdom, in the time of the fifth dynasty (*c.* 2700 B.C. or earlier), which is known to us as an age in which the plastic art was at a particularly high level '.

There is no doubt that the Egyptians of the Pyramid Age were a very remarkable people, and that they had developed exceptional technical and artistic skill ; but it is not possible to realize just how remarkable were their achievements without acquiring some first-hand familiarity with them. They possessed many qualities well developed which we today do not associate with ' the Orient '—which in fact belong nowadays solely to some of the northern races ; and, certain though it be that the ancient Egyptians possessed these qualities, it is equally certain that the same qualities are entirely absent in the East today. They were clear and logical thinkers, systematic in all they did ; they were persevering and remarkably accurate in executing plans given them, being in no way satisfied with ' near enough '—it had to be as exact as their instruments and knowledge would allow ; they were in no way afraid of tackling the most difficult mediums in which to work, and preferred them at this time (the Pyramid Age) to the more easily worked materials. They had a simple, refined and restrained taste in art, being not at all fond of the elaborate over-decoration which characterized later work, and their eye for correct detail was wonderful.

Those who are familiar with the art of the Pyramid Age consider that it reached a level unsurpassed by the art of the Middle Kingdom, the New Kingdom, or that of Saite and Ptolemaic times. The interesting objects from the eighteenth dynasty tomb of king Tut-ankh-amen, though amongst them are some beautiful things, do not reveal the same taste and refinement as the products of the Pyramid Age.

Undoubtedly a people who were capable of such masterpieces as we can still see must have had very orderly minds, and much the same ideals of art and conduct as the most advanced of modern peoples. They had a deep knowledge of nature in all her aspects, and their

representations of country scenes, animals, birds, and fish, would lead us to expect that their feelings for animals more nearly approximated to our own than to those of their modern descendants. Another very surprising aspect of their art, in view of its antiquity and expected primitiveness, is its cleanness ; there are no signs of immoral or perverted tendencies, and the only representations seen which we are not accustomed to see in public today had an obviously religious, magical, or natural significance. We can be sure that much to which we are accustomed today would have shocked them as entirely improper.

In the matter of their religion we are apt to be misled by the prejudiced views of the Hebrews in their writings. There is no doubt that the Egyptians and the Israelites did not love one another ; but whereas the Egyptians did not consider the Israelites of sufficient importance to warrant more than casual mention, the Israelites attributed every conceivable unpleasant quality to the Egyptians. At the time of the pyramids the Egyptian religion was not so complicated and inconsistent as it became later, mainly through the effort to combine a number of different beliefs.

It will be desirable here to mention some of the outstanding monuments of the period.

Of the third dynasty the most striking find is the complex of temples around the step-pyramid of Sakkara (King Zoser). This was the first big architectural adventure which the Egyptians made ; they translated into stone the age-long building methods of mud-brick, timber and reeds. The step-pyramid area was being excavated by the Egyptian Government under the direction of the late Mr Cecil Firth when the latter died about two years ago. Since then the work has halted. The ordinary visitor, with no great knowledge of Egyptian work, finds it hard to believe that these buildings are not Greek ! The simplicity, grace and technical skill is astounding.[1]

Of the time of Seneferu (fourth dynasty), there are in the Cairo Museum two very fine painted limestone statues, life-size, of Prince Rahotep and Princess Nefert (PLATE I, *frontispiece*). These two statues are remarkably life-like and the colouring is in very good condition ; the statue of Nefert in particular shows extreme freedom in handling. They were found by Daninos, in the time of Mariette, in one of the

[1] See ANTIQUITY, 1928, II, 461–3.

mastabas near the Meydum Pyramid, which itself shows a standard of skill in building scarcely exceeded later.

One of the finest pieces of work of this date (Seneferu) is the painting on plaster of six geese, removed many years ago by Vassalli Bey from one of the Meydum mastabas, and now in the Cairo Museum. The geese are feeding, and the detail of drawing and colour are very good. Also in the Cairo Museum are three wooden panels from the ' false-door ' of Hesi-Ra at Sakkara, carved with the figures of Hesi and his name and titles in hieroglyphics in slightly raised relief. The style is extremely delicate and fine, with perfect detail. The panels have often been published.

In the next reign, that of Khufu, the best known work is the Great Pyramid of Giza, whose boldness of conception and meticulous care in execution cause it to stand out from all other monuments of Egypt. To the same date belong inscribed and uninscribed sarcophagi of granite, alabaster and limestone, in the Cairo, Boston and British Museums. They vary in style, from that of Khufu-nekht in Cairo, and others like it, with intricate panelling design, to the absolutely plain and undecorated alabaster sarcophagus of Khufu's mother (Cairo). There is an ivory figure of Khufu in the British Museum which is interesting mainly because we are very badly off for representations of this king.

By far the greatest find of this reign, however, was the intact secret tomb of Khufu's mother Hetep-heres at Giza.[2] This tomb was found and excavated by the Harvard–Boston Expedition during 1925–1926 ; and the present writer shared the work of excavation and record with Dr G. A. Reisner, the Director of the Expedition. No intact royal tomb of this age had been found before, and the richness of the furniture and other objects, together with the perfect taste of the designs and decoration make this collection in the Cairo Museum the most remarkable to be found there. The chairs, bed, canopy and jewel-box were not covered with thin gold-leaf, as much of the later work was, but with heavy gold sheeting ; the gold was decorated with a mat pattern in relief, and the hieroglyphics on the pillars of the canopy are in raised relief on the gold, executed with almost perfect detail. On the ' carrying chair ' solid gold hieroglyphics were set in ebony strips. There is not a scrap of superfluous decoration, everything is in perfect taste, and the workmanship is first-class. (PLATES IV–V).

[2] See ANTIQUITY, 1927, I, 216–8.

Of the reign of Khafré, who built the second Pyramid of Giza, the finest remaining work is the diorite statue of the king in the Cairo Museum. It was discovered by Mariette in the well of the granite valley-temple along with the débris of eight other statues of Khafré (also in Cairo). It is a wonderfully executed piece of work in one of the hardest and most difficult of stones. All the detail is rendered with marvellous vigour and truth to nature, and the whole figure expresses dignity, repose and power in a remarkable degree. Petrie writes in his *History of Egypt* : ' The statues of Khafra have brought us face to face with him, and caused his features to be almost as well known in our times as in his own reign. The great diorite statue is a marvel of art, the precision of the expression combining what a man should be to win our feelings, and what a king should be to command our regard. The subtlety shown in this combination of expression—the ingenuity in the over-shadowing hawk, which does not interfere with the front view, the technical ability in executing this in so resistant a material—all unite in fixing our regard on this as one of the leading examples of ancient art '. There is also, among the other statues of this king in Cairo, a very fine green basalt figure, found in the same place as the diorite statue, and an alabaster statue which is of fine work and was found at Sakkara.

In the reign of Menkauré, the king of the third Giza Pyramid, fragments of whose bones and sarcophagus are in the British Museum, by far the finest objects are the portrait statues and the triads in slate, found by the Harvard–Boston Expedition in excavating the valley temple of the king's pyramid (PLATE VI). There are no more beautiful objects from Egypt than these slate triads of the king, Hathor, and different nome-deities ; and the slate pair-statue of Menkauré and his queen Kha-merer-nebty II. Slate is not a material to choose for ease of working, yet the execution of these statues is almost perfect and they have to be seen to be believed. Of the triads three are in Cairo and the remainder in the Boston Museum ; the slate pair is in Boston ; and there is a fine alabaster statue in Cairo. These have been illustrated in several publications, but should be looked for in Reisner's *Mycerinus* (Harvard University Press, Cambridge, Mass., 1931). The basalt sarcophagus of Menkauré was very fine, decorated with panel design, but unfortunately when Howard Vyse had removed it nearly a century ago it was lost at sea on its way to the British Museum.

Coming next to the fifth dynasty ; in the reign of Nefer-ir-ka-ré we have the tomb of the great noble Ty, the walls of which are covered

with very fine coloured relief scenes. In the Cairo Museum is the standing statue of Ranofer in painted limestone, one of the best examples of the work of this period.

The ' Precepts of Ptah-hetep ' were probably written in the reign of Dedkaré-Issy, though the earliest surviving papyrus is of the Middle Kingdom. Ptah-hetep may have been an aged tutor of the king. The ' Prisse Papyrus ' in the Bibliothèque Nationale was bought from one of the fellahin by M. Prisse d'Avennes and published in 1847 ; it is over 23 feet long and about 6 inches wide. Also from this reign is the Palermo Stone, a fragment of a list of kings from the first to the fifth dynasty, broken out of the centre of a large slab of diorite. This has been in Palermo since 1877.

In the reign of Unas there was a change in customs. The Sun-Temples, built by the preceding kings, came to an end ; and the Pyramid Texts began. These latter were religious texts inscribed on the walls inside the pyramids and are exceedingly interesting though difficult to interpret.

There are a number of objects from the fifth dynasty which cannot be placed definitely in any one reign. Of these the best known and finest are two statues, the ' Sheikh-el-Beled ' and the ' Seated Scribe '. The ' Sheikh-el-Beled ' (a name invented since its discovery) is a wooden statue found by Mariette at Sakkara, and now in Cairo. It represents a noble called Ka-aper. This statue ranks with the diorite Khafré and is a very fine piece of work ; Maspero in his *Histoire générale de l'Art : Egypte* (Hachette, 1912), says : ' Le Cheikh-el-Beled marque l'apogée de l'art memphite, et, si l'on ouvrait quelque part un salon des chefs-d'œuvre du monde entier, il est un de ceux que j'y enverrais pour l'honneur de l'art égyptien '. The second of these two statues, the ' Seated Scribe ', is in the Louvre and ranks in the same class : the expression and attitude are both perfect. There are a number of other statues of seated scribes in the Cairo Museum, but not one can be compared with that in the Louvre.

Of the time of Teti, sixth dynasty, there is a fine bronze statue of the king in the Cairo Museum which was found at Hierakonpolis. The bronze was originally on wood, but the wood has completely decayed and the statue was found in fragments of bronze sheet and has been reconstructed.

Innumerable monuments of these dynasties are not mentioned, since I have only intended to give some idea of the artistic achievements of the Pyramid Age.

APPENDIX

LIST OF PYRAMIDS IN EGYPT AND THE SUDAN

The dates are only relative and approximate, and the dimensions are given in Egyptian cubits, hands, and fingers. (The cubit contains seven hands, and the hand four fingers). The angle of slope of the pyramid-face is given in the manner of the Egyptian method of stating a slope, namely of a vertical rise of one cubit on a horizontal base of so many hands and fingers. For example, a slope of 5–2 signifies a rise of one cubit on a base of five hands and two fingers, or an angle as we express it today of 51° 51′. Under the ' base ' and ' height ' columns the measurement is given as 92.2.1, meaning 92 cubits, 2 hands, and 1 finger; sometimes, when the fraction is exact, the measurement is given as 195½, etc., meaning 195½ cubits.

No.	Date B.C.	Place	Description and Owner	Dynasty	Base c. h. f.	Height c. h. f.	Slope h. f. deg. min.
1	2840?	SAKKARA	Step-pyramid Zoser	III	205.0.3 and 225.5.3	112?0 0	2.1 72.30
2		MEYDUM	,,	III	274.0.0		2.0 73.30
3		ZAWIET-EL-ARYAN	,, Kha-ba?	III	158.0.0	195½	2.3 68
4		,,	Unfinished. Neb-ka?	III			
5	2824	DAHSHUR	North Stone. Huni or Seneferu	III–IV	408?0.0		7.1 43.40
6		,,	South Stone. ' Blunted Pyramid '		360.0.0	168.0.3	7.2 43. 1½
7	2824	MEYDUM	' False pyramid ' ' El Haram el Kaddab'	IV	275.0.0	175.0.0	5.2 51.51
8	2800	GIZA	GREAT PYRAMID. Khufu	IV	440.0.0	280.0.0	5.2 51.51
9	2800	,,	A queen of Khufu	IV	92.6.0		
10	2800	,,	A queen of Khufu	IV	92.2.1		
11	2800	,,	Queen Henutsen	IV	88.1.2	56.5.0	5.1¾ 52.10
12	2770	ABU ROASH	Dedefré	IV			
13	2760	GIZA	2nd pyramid. Khafré	IV	410.0.0	272.0.0	5.1 53. 8
14	2760	,,	A queen of Khafré	IV	40.0.0	26½	5.1 53. 8
15	2750	,,	3rd pyramid. Menkauré	IV	200.0.0	124.2.0	5.3 51.10
16	2750	,,	Menkauré's queen, Khamerernebty II	IV	98.2.0	60.4.3	6.2 51
17	2750	,,	A queen of Menkauré	IV			
18	2750	,,	A queen of Menkauré	IV			
19	2700?	,,	Queen Khent-kau-es	IV			
20	2680	SAKKARA	' HaramelMaharbish ' Userkaf	V			

APPENDIX—*cont.*

No.	Date B.C.	Place	Description and Owner	Dynasty	Base c. h. f.	Height c. h. f.	Slope h. f.	deg. min.
21	2670	ABUSIR	North pyramid. Sahuré	V	150.0.0	89.2.3	5.3	50.36
22		,,	Sahuré's queen	V	30.0.0	21.3.0	4.3	55.50
23	2660	,,	Nefer-ir-ka-ré	V	200.0.0	133.3.0	5.1	53. 8
24		,,	Khent-kau-es, queen of Nefer-ir-ka-ré	V				
25		,,	Unfinished. Nefer-ef-ré	V				
26	2640	,,	Ne-user-ré. Called pyramid of Riga, or Abu Gurob	V	150.0.0	95.3.2	5.2	51.51
27	2660	SAKKARA	Unas	V	128?			
28	2640	ABUSIR	Ne-user-ré's queen	V				
29	2570	SAKKARA	Teti	VI	122.3.0			
30	2570	,,	Teti's queen?	VI				
31		,,	Queen Yput, mother of Pepi I	VI				
32	2510	,,	Pepi I	VI	146?			
33		,,	Merenré	VI				
34		,,	'Haram el Shawaf'	?				
35		,,	Pepi II	VI				
36		,,	Queen Wezebten, wife of Pepi II	VI	31.4.0			
37		,,	Queen Yput	VI				
38	2625	,,	Neith, queen of Pepi II	VI				
39		,,	Kakaré Yby	VII				
40	2500?	GURNAH	Yntef I	XI				
41		,,	Mentuhotep III	XI				
42	2040?	LISHT	North pyramid. Amenemhat I	XII				
43	2000	,,	South pyramid. Senwesert I	XII			6.½	48.53
44		,,	Small pyramid	XII?				
45		,,	,,	XII?				
46		,,	,,	XII?				
47	2000	,,	Queen of Senwesert I	XII				
48	1938	DAHSHUR	'White pyramid'. Amenemhat II	XII				
49	1906	LAHUN	Senwesert II	XII			9.½	42.35
50	1887	DAHSHUR	North Brick pyramid Senwesert III	XII	204?			

APPENDIX—*cont.*

No.	Date B.C.	Place	Description and Owner	Dynasty	Base c. h. f.	Height c. h. f.	Slope h. f. deg. min.
51	1849	DAHSHUR	South Brick, or 'Black Pyramid.' Amenemhat III	XII	200?		
52	1849	HAWARA	Amenemhat III?	XII			6.½ 48.45
53		DAHSHUR	A queen's pyramid	?			5.3½ 50
54		SAKKARA	Userkaré Khenzer	XII			
55	1850?	GURNAH	Nub-kheperé Yntef	XVII			
56		,,	Sekhemré Upmaat Yntef	XVII			4.0 60
57		,,	Sekhem-Shedtawy-Sebekemsaf	XVII			
58		,,	Sekenenré Ta-a	XVII			
59		,,	Sekenenré Ta-a-a	XVII			
60	1700?	,,	Waz-Kheperré Kames	XVII	15.2.0	17.1.1	3.½ 66
61	1700?	ABYDOS	Ahmes I	XVIII			
62	1640	,,	Queen Tetisheri	XVIII			
63	750	KURRU	No. 8. Kashta	XXV			
64	744	,,	No. 17. Piankhy	XXV			
65	710	,,	No. 15. Shabaka	XXV			
66	700	,,	No. 18. Shabataka	XXV			
67	688	NURI	No. 1. Taharka	XXV	98.6.0	128.5.0	2.2¾ 69
68	688?	,,	No. 21. A queen	XXV			
69	688	,,	No. 35. A queen ?	XXV			
70	663	KURRU	No. 16. Tanutaman	XXV			68 ?
71	653	NURI	No. 20. Atlanersa	XXV	23.0.3	26.3.0	66½
72	653	,,	No. 36. Queen Atakhibasken	XXV			
73	643	,,	No. 3. Senkamanseken	XXV	52.5.1	59.1.2	66
74	640?	,,	No. 41. Queen Mara-?n	XXV			
75	?	,,	No. 42. ?	XXV			
76	?	,,	No. 43. ?	XXV			
77	623	,,	No. 6. Anlaman	XXV	53.6.2	46.4.3	60
78	623	,,	No. 22. Queen of Anlaman	XXV			
79	623	,,	No. 23. Queen Maslaya	XXV			
80	593	,,	No. 8. Aspalta	XXV	53.1.1	49.6.3	62
81	593	,,	No. 24. Queen Nansalsa	XXV			
82	593	,,	No. 27. Queen Madigan	XXV			

APPENDIX—*cont.*

No.	Date B.C.	Place	Description and Owner	Dynasty	Base c. h. f.	Height c. h. f.	Slope h. f. deg. min.
83	593	NURI	No. 38. Queen Aaqata	XXV			
84	?	,,	No. 39. ?	XXV			
85	?	,,	No. 40. ?	XXV			
86	563	,,	No. 9. Amtalqa	XXV	53.0.1	65.4.0	68?
87	563	,,	No. 26. Queen Amantakaya	XXV			
88	553	,,	No. 5. Malenaqan	XXV	53.1.0	65.5.0	68?
89	553	,,	No. 25. Princess Maletalen?	XXV			
90	553	,,	No. 28. Queen Henut-Takhabit?	XXV			
91	538	,,	No. 18. Nalma'aya	XXV	20.3.0	25.2.3	68?
92	533	,,	No. 10. Netaklabataman	XXV	54.0.0	46.5.2	60
93	513	,,	No. 7. Karkaman	XXV	53.0.0	45.6.1	60
94	513	,,	No. 30. Queen?	XXV			
95	503	,,	No. 2. Astabarqaman	XXV	53½ & 51		59
96	500?	,,	No. 29. Queen Piankh-har?	XXV			
97	473	,,	No. 4. Sa'asheriqa	XXV	51.4.0	63.5.1	68?
98	458	,,	No. 19. Nasakhma	XXV	18.4.1	22.6.1	68?
99	453	,,	No. 11. Malewiyaman	XXV	51.2.0	52.4.0	64
100	453	,,	No. 31. Queen ?	XXV			
101	453	,,	No. 32. Queen ?	XXV			
102	423	,,	No. 16. Talakhaman	XXV	23.1.0	28.4.2	68?
103	418	,,	No. 12. Amanherinutarik	XXV	51.0.2 &62.1.0		62
104	418	,,	No. 33. Queen ?	XXV			
105	418	,,	No. 34. ?	XXV			
106	398	,,	No. 17. Baskakeren	XXV	23.6.2	29.3.3	68?
107	350?	,,	No. 37. Queen ?	XXV			
108	350?	,,	No. 48. Queen ?	XXV			
109	?	,,	No. 49. ?	XXV			
110	?	,,	No. 50. ?	XXV			
111	?	,,	No. 51. ?	XXV			
112	?	,,	No. 52. ?	XXV			
113 to 131	?	,,	Nineteen small pyramids of Royal Ladies, south of No. 1	XXV	23?		

APPENDIX—*cont.*

No.	Date B.C.	Place	Description and Owner	Dynasty	Base c. h. f.	Height c. h. f.	Slope h. f. deg. min.
132	397	NURI	No. 13. Harsiotef	XXV	51.2.3	63.3.1	68?
133	397	,,	No. 44. Queen Banhaly	XXV			
134	?	,,	No. 45. ?	XXV			
135	?	,,	No. 46. ?	XXV			
136	?	,,	No. 47. ?	XXV			
137	362	KURRU	No. 1. Piankhalara	XXV			
138	342	NURI	No. 14. Akhratan	XXV	50.6.2	62.6.2	68?
139	328	,,	No. 15. Nastasen	XXV	50.2.3	62.1.3	68?
140	308	BARKAL	No. 11 ?	Na–1			
141	300	BEGARAWIYAH	No. S6. Arikakaman	KM			
142	280	,,	No. S5. Yesruwaman	KM			
143	275	BARKAL	No. 14. ?	Na–1			
144	265	BEGARAWIYAH	No. S10. Kaltaly	KM			
145	265	BARKAL	No. 15. ?	Na–1			
146	255	,,	No. 18. ?	Na–1			
147	255	BEGARAWIYAH	No. N4. Aman–?–tekha	KM			
148	245	BARKAL	No. 7. ?	Na–1			
149	242	BAGARAWIYAH	No. N53. ?	KM			
150	225	,,	No. N7. Ergamenes	KM			
151	200	,,	No. N9. Azagraman	KM			
152	180	,,	No. N8. Nahirqa?	KM			
153	160	,,	No. N11. Nahirqa?	KM			
154	150	,,	No. N12. Shanek-zekheté	KM			
155	125	,,	No. N13. ?	KM			
156	100	BARKAL	No. 6. ?	Na–2			
157	100	BEGARAWIYAH	No. N20. ?	KM			
158	85	BARKAL	No. 4. ?	Na–2			
159	80	BEGARAWIYAH	No. N21. ?	KM			
160	65	BARKAL	No. 2. ?	Na–2			
161	60	BEGARAWIYAH	No. N14. ?	KM			
162	45	,,	No. N2. Amantabale?	KM			
163	45	BARKAL	No. 9. ?	Na–2			

APPENDIX—*cont.*

No.	Date B.C.	Place	Description and Owner	Dynasty	Base c. h. f.	Height c. h. f.	Slope h. f. deg. min.
164	45	BARKAL	No. 10. ?	Na–2			
165	45	BEGARA-WIYAH	No. N6. Aman-shakhéte	KM			
166	25	,,	No. W5. Queen ?	KM			
167	15	,,	No. N22. Netekaman	KM			
168		,,	No. N1. Queen Amantère	KM			
169	15	,,	No. N10. Sherakarer	KM			
170	20	,,	No. 15. ?	KM			
171	40	,,	No. N16. Akhyes-teme?	KM			
172	50	,,	No. N17. Amanitenmemize	KM			
173	75	,,	No. N18. Amankhanewel?	KM			
174	100	,,	No. N40. ?	KM			
175	105	,,	No. N34. Artanyeszeme	KM			
176	130	,,	No. N28. Tameqerze-amani	KM			
177	150	,,	No. N41. ?	KM			
178	160	,,	No. N29. Takizemani	KM	16¼	21.5.3	2.2½ 72
179	180	,,	No. N30. ?	KM			
180	200	,,	No. N19. Tarekenizel ?	KM			
181	200	,,	No. N32. ?	KM			
182	225	,,	No. N55. ?	KM			
183	225	,,	No. N37. ?	KM			
184	235	,,	No. N38 ?	KM			
185	250	,,	No. N36. Maniterara	KM			
186	270	,,	No. N35. ?	KM			
187	270	,,	No. N51. ?	KM			
188	290	,,	No. N24. ?	KM			
189	310	,,	No. N27. ?	KM			
190	330	,,	No. N26. ?	KM			
191	340	,,	No. N25. ?	KM			
192		,,	No. N5. Prince Arik-Kharer	KM			

APPENDIX—*cont.*

The dynasties from pyramids no. 140 to 192 in the list are indicated by the following abbreviations :—

Na–1	.. ..	1st Meroitic dynasty of Napata
Na–2	.. ..	2nd Meroitic dynasty of Napata
KM	.. ..	Kingdom of Meröe

Pyramids 1 to 39 properly belong to the ' Pyramid Age ' ; 40 to 54 to the ' Middle Kingdom ' ; 55 to 62 to the ' New Kingdom ' ; and the remainder to the Ethiopian dynasties ruling at Napata and Meröe in the Sudan.

The Middle Kingdom pyramids are poorer than anything of the earlier period and those of the New Kingdom are mostly very small indeed and of very poor workmanship. The Ethiopian pyramids are quite a new departure. They have a much steeper angle of slope than the earlier examples, are quite small, and bear little resemblance to the great works of the Pyramid Age.

Stukeley, Avebury and the Druids

by Stuart Piggott

THERE have been few tendencies in the history of English culture with so profound a contemporary influence as the so-called Romantic Movement of the 18th and early 19th centuries, and still fewer with such a strangely assorted progeny. That toying with ' the Gothick ', which produced such early *jeux d'esprit* as Walpole's Strawberry Hill or Beckford's Fonthill, led, on the one hand, to the Albert Memorial, and, on the other, to the sculpture of Eric Gill ; in literature, while the Romantics founded an honourable poetic tradition extending from Collins through Wordsworth to Blunden, it is surely not fantastic to see in such works as Lewis' *Bravo of Venice* the genesis of the modern thriller. Most strange of all, one outcome of the Romantic Movement was a new branch of science. For prehistoric archaeology in England was not the product of the classical lore so eagerly absorbed from Italy in the 16th and 17th centuries, but originated in those eccentric gentlemen of the 18th century who perambulated the countryside studying at first hand the antiquities of their own forefathers.

Easily the greatest of these early antiquaries was William Stukeley, and few individuals have left posterity such a mass of potential biographical material. While his published works are relatively few, he zealously kept every scrap of his own manuscript writings, his drawings, the proofs of his published engravings ; his correspondence with antiquaries of the day ; numerous notebooks, and twenty volumes of his diary, as well as two autobiographical essays. The main bulk of these papers was preserved by his descendants, the St. Johns of Dinmore Court, Herefordshire, and, with some additional material from other sources, were utilized by W. C. Lukis in his edition of *The Family Memoirs of the Rev. William Stukeley, M.D.* prepared for the Surtees Society in 1882–7. In 1924, some of the Dinmore Court MSS. were presented to the Bodleian[1] (which already possessed, in the Gough

[1] *Bodleian Quarterly Record*, October 1924, no. 43, 149.

PLATE I

WILLIAM STUKELEY AND HIS WIFE FRANCES

Drawing by Stukeley in a MS Genealogy (*c.* 1730) in the possession of Alexander Keiller

facing p. 22

topographical collections, several important Stukeley MSS.); others were purchased by that Library and by Mr Alexander Keiller, who has since acquired additional MSS. from time to time.[2] With such a plethora of material it is obviously impossible, in the space of a single article, to do more than indicate the main outlines of Stukeley's life, and to deal in detail with a single, but extremely important aspect of his archaeological work—the apparent mixture, in his published account of Avebury, of sound field-work with so much fantastic theorizing that in popular estimation the second characteristic has swamped the first. Most archaeologists today would probably endorse Tom Hearne's opinion of Stukeley—' He is a very fanciful man, and the things he hath published are built upon fancy '—but those who have had occasion to check his field-observations know him as an accurate and careful observer. A study of his life and thought as reflected in his own writings shows that this paradox is capable of explanation.

William Stukeley was born in 1687,[3] at Holbeach in Lincolnshire, his father, John Stukeley, being a lawyer in partnership with his elder brother Adlard. Engaging glimpses of his boyhood days can be gathered from his memoranda—his learning to write at the age of seven ' of Mr Coleman who taught us in the Quire of the Church ' ; or later, being taught to dance ' among the other young Fry of the Town ' ; and playing the flute, an accomplishment of which evidence exists today in a volume of flute music which he copied out in 1714.[4] We see him listening behind a screen to the conversations between his father and Mr Belgrave—' an ingenious Gent '—on astronomy, and writing an essay to controvert their arguments ; making maps of the country round Holbeach, or a puppet theatre in imitation of one he had seen. In 1700 he was apprenticed in his father's office, but his inclinations did not lie in the study and practice of the law, and in response to his entreaties he was sent to Cambridge to study medicine, where he was admitted a pensioner at Corpus Christi in November 1703.

At Cambridge, Stukeley found himself in a congenial atmosphere. He attended Vigani's lectures on chemistry, went botanizing in the

[2] The writer owes a debt of gratitude to Mr Keiller not only for indicating in the first place the possibilities of the MSS., and suggesting the research of which this paper is an outcome, but for placing them unreservedly at his disposal and giving every facility for their study.

[3] Where the source is not otherwise given, the details of Stukeley's life are derived from Lukis' published work referred to above.

[4] A.K. MSS.

country around to collect material for a new edition of Ray's *Catalogus Plantarum*, and ' began to conceive a passionate Love for Antiquitys '. He gives a description of his room at Corpus :

> ' which had a very strange appearance with my furniture in it, the wall was generally hung round with guts, stomachs, bladders, preparations of parts and drawings. I had sand furnaces, Calots, glasses, and all sorts of chymical implements. . . . Here I and my Associats often dind upon the same table as our dogs lay upon. I often prepard the pulvis fulminans and sometimes surprized the whole College with a sudden explosion. I cur'd a lad once of an ague with it by a fright '.

One suspects that he was not wholly popular with those who inhabited rooms adjacent to his.

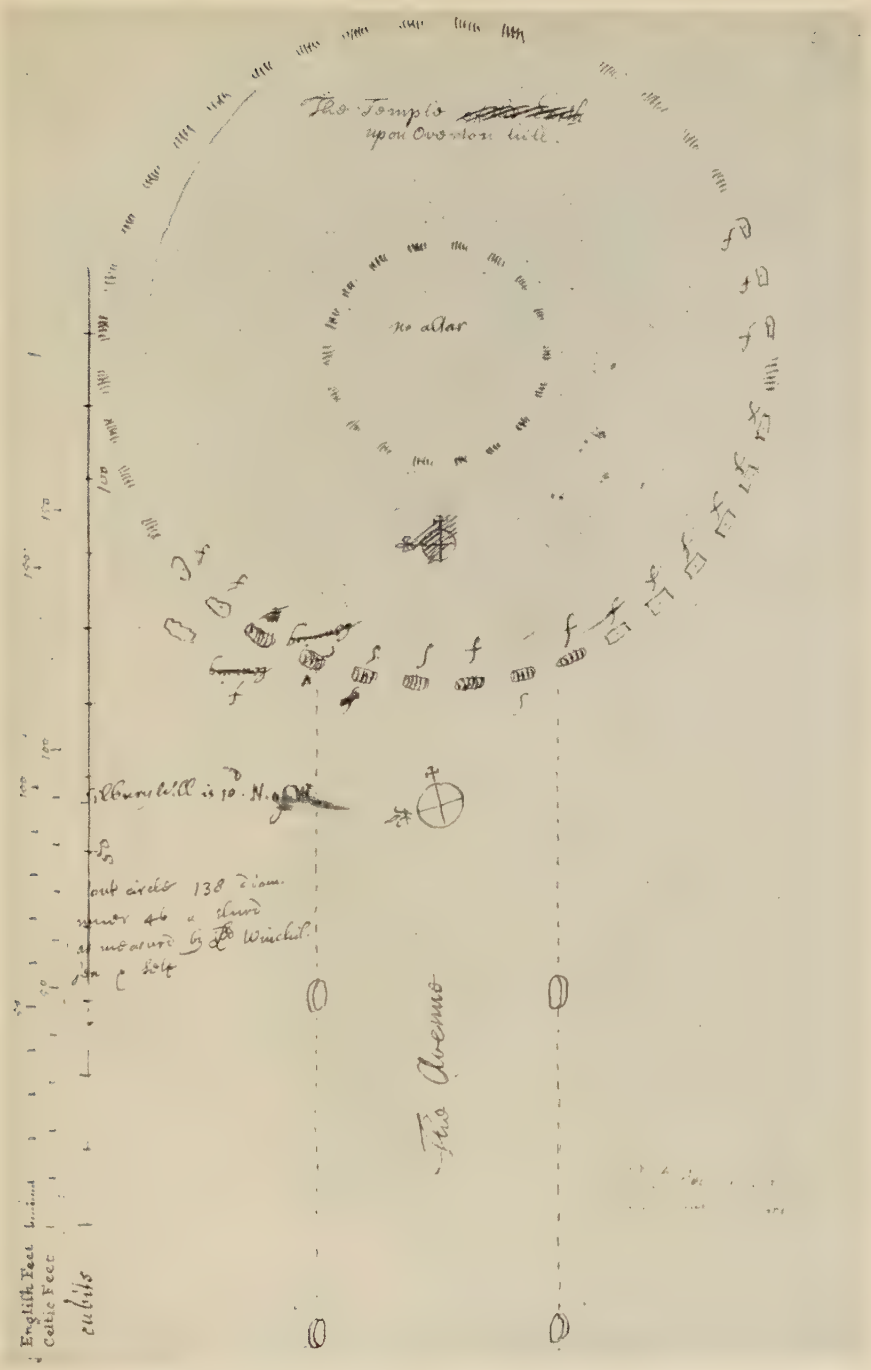
Stukeley's father died in 1705, his mother two years later, and on his taking his M.B. in 1709 he went to London to study at St. Thomas' hospital. Before this, however, he paid a visit to friends in Northamptonshire, where it appears that he was not insensible to the charms of his host's daughter Martha, who

> ' had somewhat of an airy temper, and accompanyd me in several of my Rambles in that Country to view Antiquitys, Roman Camps, and the like. We traveld together like Errant Vertuosos, and when we came to an old ruind Castle, etc., we climbd together thro' every story and staircase, mutually helping one another, and pulling each other over the gaping arches and rugged heaps of rubbish, and when I had occasion to draw a view of them out, as we sat upon a stone or the grass, she held my ink horn or my paper, and was very serviceable and assistant in taking my designs, and all without any reserve or immodesty ; nor could any aged Philosophers have conversd together with more innocent familiarity or less guilt even in thought or intention. Nor could travailing curiosity or Antiquarian Researches be rendered so agreeable as with a fair and witty Companion and Fellow laborer, and when we returnd home my young Disciple could entertain the Family with so very curious Relation of the curiositys we had seen, that it would be difficult to say whether so nice taste in the Remains of Ancient Time most recommended a young Lady, or that Refined study became more lovely and delightful for her sake '.

There is a faint tang of bitterness and regret in that brief sentence which closes the episode in his ' Commentarys '—' She is since marryd to a Gentleman in Wales '.

For the next ten years Stukeley practised medicine ; in Lincolnshire at first, but from 1717 in London, where he was in 1720 elected a Fellow of the College of Physicians, reading the Gulstonian Lecture to that body in 1722. His wide range of scientific interests had already secured him a Fellowship of the Royal Society in 1717, but archaeology was rapidly becoming his principal pursuit. His interest in the antiquities of his own country was symptomatic of the feeling among the intelligentsia of his day, for already for some time ' a number of

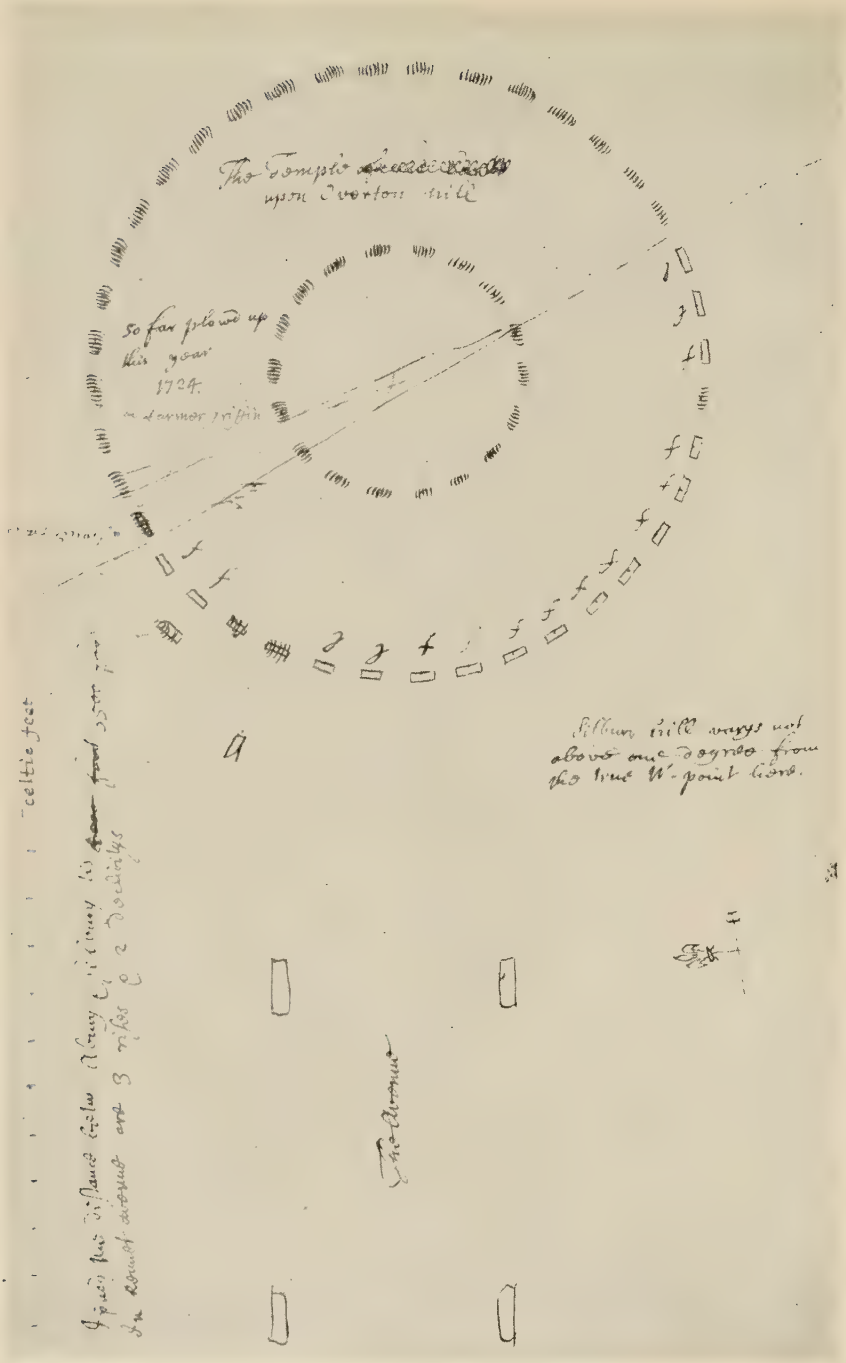
PLATE II



STUKELEY'S ORIGINAL FIELD-SKETCH OF THE PLAN OF THE OVERTON HILL STONE CIRCLES. (1724)
Bodleian Library, MS Gough Maps 231, f. 54r.

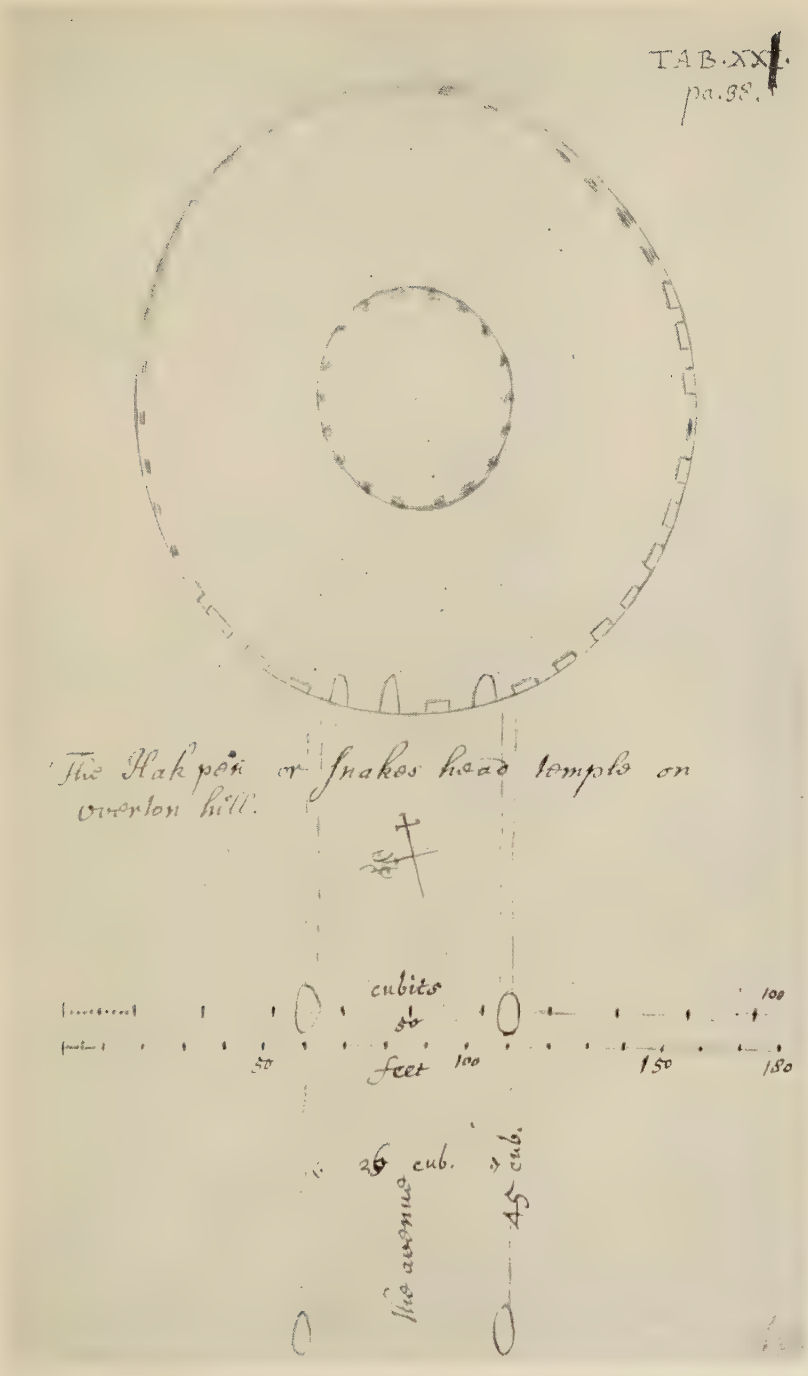
facing p. 24

PLATE III


The Temple upon Overton hill
So far plowed up this year 1724.
Celtic feet
Silbury hill varys not above one degree from the true W. point here.

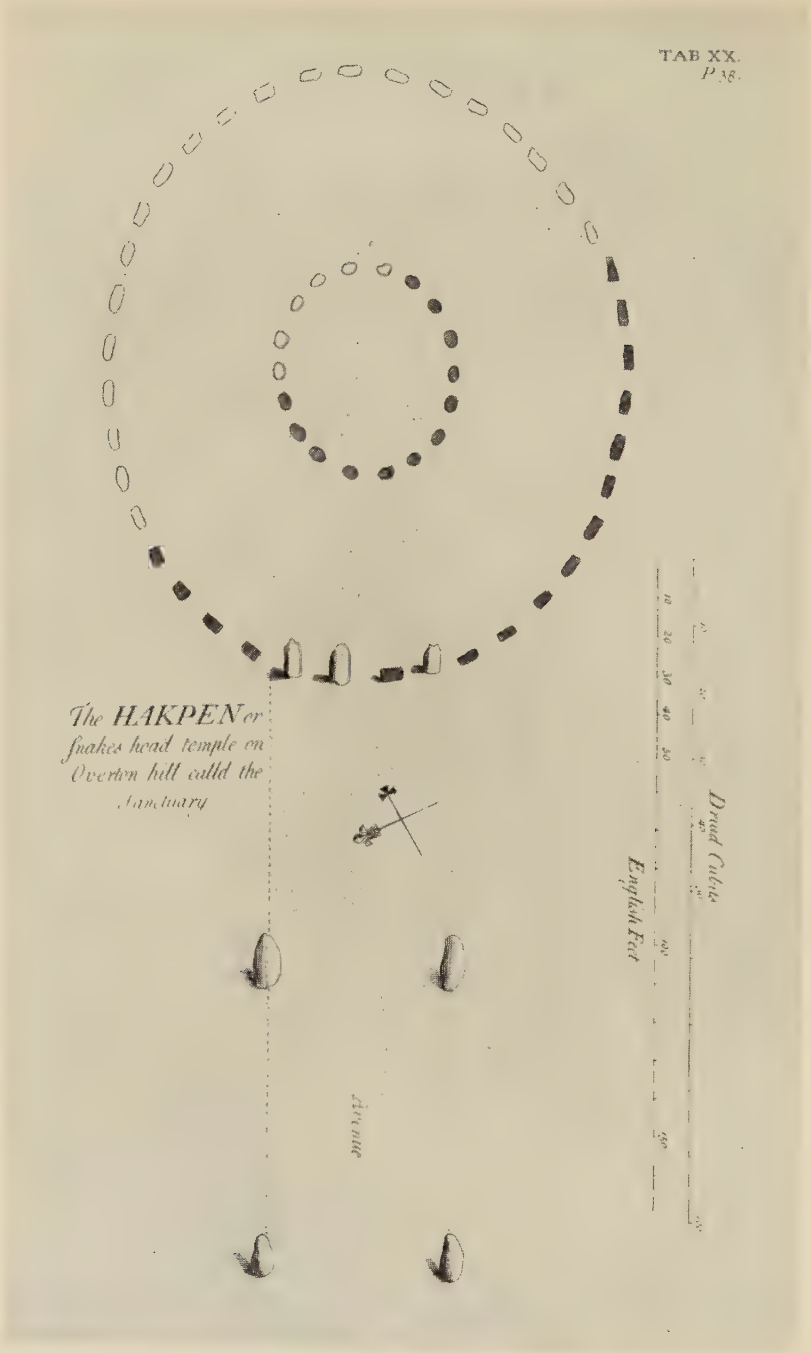
STUKELEY'S ORIGINAL FIELD-SKETCH OF THE PLAN OF THE OVERTON HILL STONE CIRCLES. (1724)
Bodleian Library, MS Gough Maps, 231, f. 90.

PLATE IV



DRAWING (*c.* 1740) FOR THE PUBLISHED PLATE OF THE OVERTON HILL STONE CIRCLES, THOUGH NOT THE FINAL VERSION, SHOWING THE CIRCLES ALTERED TO OVALS
MS in the possession of Alexander Keiller

PLATE V



OVERTON HILL STONE CIRCLES: PLAN PUBLISHED IN STUKELEY'S 'ABURY'. Tab. XX (1743)

gentlemen residing in and about London, of like inclination . . . used to meet weekly, on a Wednesday evening, as a club, at the Mitre Tavern in Fleet Street. Their conversation turn'd on matters of learning, chiefly Antiquitys'.[5] On his coming to London in 1717 he was introduced to the club by Maurice Johnson and the next year was largely instrumental in forming the dining club into a more formal body; this in his account of its founding he calls indifferently the Antiquarian Society or The Society of Antiquaries, and under the latter title it has continued to the present day.

The foundation of the Society of Antiquaries, of which Stukeley was the first secretary, marks the real beginning of his archaeological career, during the first ten years of which he made a very considerable contribution to British archaeology. For it was between 1718 and 1725 that he carried out his monumental series of field-observations at Avebury and Stonehenge, without which our knowledge of those great megalithic structures would be materially less. At Stonehenge little destruction took place after his day, but Avebury was wrecked to such a degree that, without his record of its appearance two hundred years ago, we could glean but little from its shattered remnants. Before we come to consider his work on these monuments in some detail, it is well to emphasize one point. Since his entering Cambridge, his training and environment had been essentially that of a scientist. His medical work, coupled with a genuine bent for scientific research so far as it was known at the beginning of the 18th century, would naturally cause him to bring to bear upon the study of antiquities an acute and observant eye ; a mind accustomed to diagnosis would grasp the salient points and make cautious deductions from them ; while he would appreciate the value of an accurate record of fact both in words and in drawings, the latter made easier by his own considerable talent in sketching (a talent, alas, to which the engravers of his published plates rarely did justice). In fact, Stukeley was one of the first of that large band of medical men who have turned their scientific training to the study of archaeology with excellent effect.

It is commonly thought that Stukeley started his Avebury field-work, and to some extent that at Stonehenge, with a preconceived theory dominating his mind—that Hydra-headed, tortuous monster of perverse ingenuity which, in the published accounts of these monuments, is so much in evidence that the solid basis of fieldwork

[5] MS. History of the Society of Antiquaries (A.K.)

is almost stifled, Laocoon-like, by its involved coils. We shall see, however, that there is no evidence that this was the actual state of affairs.

In the newly founded Society of Antiquaries, Stukeley met and rapidly formed a close friendship with Roger Gale, son of the master of St. Paul's School. Gale had had access to, and had transcribed some of the manuscript of John Aubrey's *Monumenta Britannica*, which at that time was in the hands of Awnsham Churchill, the bookseller and publisher,[6] and it seems more than likely that Aubrey's description of Avebury fired Stukeley and Gale to make an expedition to this site and to Stonehenge in 1718. At all events the journey was made, and in December of that year Stukeley copied Aubrey's account of Avebury, and his plan, from Gale's transcript, into his commonplace book.[7]

As Mr T. D. Kendrick has shown, in the only sane book on Druids ever written,[8] Aubrey was the first to claim Stonehenge, Avebury and other megalithic monuments for the Druids, and it seems that from this ' humble submission to better judgment ' as Aubrey himself styled his hypothesis, Stukeley ultimately built his incredible structure of fantastic theory. But in the years immediately following 1718, theory occupied a secondary place : Stukeley was working as a scientist. About this time he was attacked by gout, and rode ' on horseback in the spring, for recovery of his health. By this means, he indulged his natural love of antiquitys, especially those of his own Country '. In 1721, and 1723, he undertook lengthy tours of southern and midland England with Roger Gale, making numerous notes and drawings which were published as *Itinerarium Curiosum, Centuria I*, in 1724. But his main work was the fortnight or so of each year devoted to Avebury and Stonehenge, and sufficient material remains (thanks largely to his habit of dating most of his drawings) to reconstruct a journal of his work on the former site, in which his change of mental outlook can be clearly traced.

In May 1719, he made his first ' rude general sketch ' of the Avebury circles,[9] and part of the Kennet Avenue ; in 1720 and 1721 he again

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[6] W. Long, *Abury Illustrated* (Devizes, 1862), 61. (Reprinted from *Wilts Arch. Mag.* IV and VII, but with additions not published elsewhere).

[7] Commonplace Book 1717–1748, in the library of the Wiltshire Archaeological Society at Devizes.

[8] T. D. Kendrick, *The Druids* (1927), 8.

[9] In the Commonplace Book at Devizes.

visited the site, the second time with Roger Gale. In 1722, he made a first draft of a large scale-plan of the circles[10] as well as other drawings, and discovered the problematical Beckhampton Avenue.

It is in 1722 and 1723 that for the first time we can detect some hint of Stukeley's searching for a theory to account for the lay-out of the circles and avenues. On the manuscript plan of the circles of 'The Remains of the BRITISH Temple in the village of AVBVRY Wilts, Aº 1722' to which we have referred, the two double concentric circles within the main circle are called 'The Lunar Temple' and 'The Solar Temple'; subsequently altered to 'Northern' and 'Southern' temples respectively. On 8 July 1723, he made his well-known drawing of the stone circles of 'The Sanctuary' on Overton Hill, and in its original form called it the 'Temple of Ertha';[11] on 19 July he made the drawing of 'A view from the spot of the Temple at the end of Bekampton Avenue'.[12] His original plans of the sanctuary described below were also in the first instance called 'The Temple of the Earth'. To this year also must belong a great panoramic view of the whole Avebury complex,[13] although it is undated. On this drawing, probably Stukeley's finest piece of draughtsmanship, there is indicated a hypothetical circle at the end of the Beckhampton Avenue to balance those on Overton Hill, and against it is written (and subsequently heavily crossed out) 'Temple of the Infernal Regions'.

A cosmic theory was obviously in his mind, and this is amplified with regard to the circles at Stanton Drew, which Stukeley visited on 23 July 1723, after he had been working at Avebury for nearly a fortnight. The engravings made from his drawings of Stanton Drew were published posthumously in *Centuria II* of the *Itinerarium Curiosum*, where one is called the 'Solar Circle', and in his account of the circles, published in the same volume under the title of 'The Weddings', and which we know from the manuscript[14] to have been written in March 1724, the theory of Solar and Lunar Temples, and the Temple of the Earth, is set forth and compared with Avebury.

It is clear therefore, that when first Stukeley began to theorize, it was not his famous Serpentine ideas that filled his head, nor, in fact, does he seem to have regarded his celestial theory with any great seriousness, for he abandoned it in 1724. It is necessary to explain at

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[10] *Avebury Drawings* (A.K.)
[11] *Proof Plates*, no. 62 (A.K.)
[12] *Ibid.* no. 61 (A.K.)
[13] *Avebury Drawings* (A.K.)
[14] A.K. MSS.

this point that it appears to have been his custom to have his drawings engraved directly after each yearly visit, and on his next visit he would correct proofs on the spot ; increasing shading here, deleting a tree there, or altering the title. The proof engraving of what eventually became tab. XXI of his ' Abury ', (the view of the Sanctuary), was, as we have seen, originally entitled ' the Temple of Ertha ', but on 18 May 1724, when he was again at Avebury, he altered this to the sensibly non-committal ' Temple on Overton Hill ', fortunately dating the correction on the proof. A similar correction was also made on his original plans of the site. The Beckhampton ' Temple ' being no longer needed—' The Infernal Regions ' being unnecessary with no ' Temple of Ertha '—the proof of this view, mentioned above, was altered from ' Spot of the Temple ' to ' Near the Spot of the Termination of the Bekampton Avenue ' (*Abury*, tab. XXV). It is probable that the alterations to the main plan, of ' Northern ' and ' Southern ' for ' Lunar ' and ' Solar ' Temples were made at the same time.

This year, 1724, was the last at Avebury. Stukeley, unhampered by theories, completed his magnificent detailed record, both in notes and illustrations, of a monument which was being destroyed before his eyes. We owe him a deep debt of gratitude for his Avebury work, and scarcely less for that on Stonehenge which he carried on during the same years, 1718–24. Stukeley discovered the Avenue and the Cursus, and, incidentally, it is to him that we owe the term ' trilithon ' for the megalithic units at Stonehenge. The dramatic recovery of the Avenue, lost for two hundred years, by air-photography in 1921, was a vindication both of the accuracy of Stukeley's observations and of the utility of this recently adopted adjunct to archaeological research.

Any modern archaeologist who has had occasion to test the accuracy of Stukeley's field-work during the decade 1718–27, will have proved the complete reliance that can be placed upon it. In 1725 Stukeley and Roger Gale made a tour in northern England, the journal of which, entitled *Iter Boreale*,[15] was not published until after Stukeley's death, in the second part of the *Itinerarium Curiosum*. Mr Crawford has recently shown, in the pages of ANTIQUITY,[16] the use to which he was able to put a drawing of the stone circle of Long Meg and her Daughters, made during this tour, in identifying the site of a now destroyed adjacent circle. Instances such as this might be multiplied indefinitely.

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[15] The original MS. is in the A.K. Collection.

[16] ANTIQUITY, 1934, VIII, 328–9 (plates I, II).

In February 1727, Stukeley wrote to Roger Gale :

> ' I begin now and then to peep over my old papers and drawings, and among antiquity matters Abury seems to touch my fancy the most at present, and probably, if business does not too much encroach upon my time, I shall publish it in a year or two '.

Had Stukeley acted on this worthy resolution his reputation today as an archaeologist would have been very different. But, unfortunately, other matters did encroach upon his time, with lamentable results. Neither his leaving London and going to live in Grantham in 1725, nor his marriage in 1728 to Frances Williamson, were likely to prejudice his archaeological judgment; but in June 1729 he took a step of which the consequences profoundly coloured his whole subsequent outlook.

Despite his scientific training, it is clear that there had always been a strong underlying vein of mysticism in Stukeley's character, increasing as the years went by. A love of elaborate symbolism and allegory probably accounts for his entry into Freemasonry in 1721,[17] and once he had begun to think about Druids his fancy led him into strange paths. He laid out a ' Druidical grove and temple ' in his garden at Grantham, and in 1728 he buried a still-born child

> . . . ' under the high altar in the chappel of my hermitage vineyard ; for there I built a niche in a ragged wall overgrown with ivy, in which I placed my roman altar, a brick from Verulam, & a waterpipe lately sent me by my Lord Colrain from Marshland . . . there we enterred it, present my wives mother & aunt, with ceremonys proper to the occasion '.

It is perhaps surprising, after this semi-pagan ritual, to find him writing in June 1729, to his friend Dr Wake, Archbishop of Canterbury, asking his advice and help in the matter of ordination for the church, and hinting darkly that his Druidical researches had led him to ' some notions about the Doctrine of the Trinity, which I think are not common '. He was apparently more explicit in a letter to Roger Gale, to such a degree that that worthy man was seriously alarmed at his friend's decision, for he wrote back urging a reconsideration. ' Your reconciling Plato & Moses ', he goes on, ' & the Druid & Christian Religion may gain you applause, & perhaps a Patron ; but it is good to be sure of the latter upon firmer motives than that scheme may inspire people with at present '. But Stukeley was not to be deterred. He had decided that every pagan religion, particularly that of the Druids, was a

[17] For Stukeley's masonic career see R. F. Gould in *Ars Quatuor Coronatorum*, VI.

foreshadowing, not only of Christianity, but of the doctrine of the Trinity, and with this weapon he was going to battle against the sceptics in ' this age of epidemical infidelity '. And so we see him ordained in November 1729, and appointed to the living of All Saints, Stamford.

Fired with all the misguided enthusiasm of the religious revivalist, Stukeley's first task was to utilize his field-work of the last ten years as ammunition in his holy war. Poor Avebury was the first victim of this transforming process. Gale writes in June 1730 to congratulate Stukeley on his resumption of work on the Avebury book, and declares himself ' much pleased with the plan of your theologicall enlargements upon it '. Enlargements they certainly were, and in a letter in reply on 25 June, Stukeley reveals their true nature.

> ' The form of that stupendous work [Avebury] is the picture of the Deity, more particularly of the Trinity. . . . A snake proceeding from a circle is the eternal procession of the son from the first cause. . . . My main motive in pursuing this subject is to combat the deists from an unexpected quarter, and to preserve so noble a monument of our ancestors' piety, I may add orthodoxy '.

Stukeley had indeed plunged deeply into the waters of religious controversy. Scepticism was at this time becoming fashionable under Hume and the younger Dodwell, having developed out of the early forms of Deism of Chubb, Tindal and Toland. Now Toland, in addition to his more obviously controversial religious works, had written a diffuse and involved *History of the Druids*, containing scarcely veiled attacks on ' priestcraft ' in general, which was published posthumously in 1726, and is more than once referred to by Stukeley in his published accounts of Avebury and Stonehenge. It is possible that Stukeley's attack on Deism through the Druids may have been tinged with some personal feeling against the unfortunate Toland, more particularly when we find that about 1710 Toland had published his *Origines Judaicae*, in which he ridiculed one Huetius, who in a work entitled *Demonstratio Evangelica*, had sought to prove that various Old Testament characters were allegorized in heathen mythology (including, rather unexpectedly, Moses as Bacchus)—a scheme not unlike Stukeley's own theories.

After this we are less surprised than we might be to find that, when *Stonehenge* was finally published in 1740 it was graced with a preface explaining that it, and the forthcoming *Abury*, were to be considered merely as parts of a great work entitled ' Patriarchal Christianity, or a Chronological History of the Origin and Progress of true Religion, and of Idolatry '. He had decided, he says, to publish *Stonehenge* and

Abury first, ' and proceed to the speculative parts afterwards ; reserving them, God willing, to the maturer time of my life '. ' My intent is ', he goes on

> ' to warm our hearts into that true sense of Religion, which keeps the medium between ignorant superstition and learned free-thinking, between slovenly fanaticism and popish pageantry, between enthusiasm and the rational worship of God, which is no where upon earth done, in my judgement, better than in the Church of *England* '.

And so we find that odd and incongruous mixture in the published accounts of Stonehenge and Avebury—sound field-work and careful observation side by side with the wildest imaginative flights, according to whether Dr William Stukeley or the Rev. William Stukeley was the dominant mental character at the moment. So far as can be seen, enough remained of his scientific conscience to prevent him from materially altering the facts to fit his theories, but in one instance at all events he was guilty of a very grave crime in this direction.

His published plan (*Abury*, tab. xx) of the destroyed stone circles on Overton Hill, known as ' The Sanctuary ', shows them not as circles, but as ovals (PLATE V). As Captain and Mrs Cunnington's excavations of 1930 proved, they were in fact true circles (*Wilts. A.M.* XLV, 300). After this discovery, Stukeley's reputation as a field-archaeologist seemed likely to wane, but it is fortunate that in the Bodleian there are two original field-sketches of this plan,[18] and in both the circles are drawn *as* circles, and even some of the ' extra ' stones near the junction with the Kennet Avenue, the sockets for which were found in 1930, are shown (PLATES II, III). The intermediate link between these excellent plans and the misleading published record of the site is provided by an original drawing *c.* 1740 which, while not that from which the plate was engraved, comes very close to it in detail[19] (PLATE IV). In this the stones (or stone-holes) are arranged as ovals in grey wash, but are superimposed on a faint pencil outline showing them as circles, while in one of the original plans a rough oval outline has likewise been sketched. We can only feel that Stukeley, by now completely theory-ridden, thought how desirable it would be to give his snake an oval, more naturalistic, head, and so committed the serious offence of altering his original survey.

After the publication of *Stonehenge* in 1740 and *Abury* in 1743, Stukeley's archaeological career, though pursued with enormous

[18] MS. Gough Maps, 231, 9^{v} 54^{r}. [19] *Avebury Drawings* (A.K.)

vigour, is the melancholy record of the decay of a once-sound mind. It was in 1747 that he received the letter from Charles Bertram of Copenhagen, which ultimately led to his accepting as genuine the famous forgery of Richard of Cirencester, the story of which has been told in these pages by Mr H. J. Randall.[20] His subsequent archaeological productions were a most involved farrago of far-fetched hypotheses, coupled with an almost infantile credulity. The career of Carausius had long interested him, but unfortunately he misread FORTVNA on a coin as ORIVNA, and thereupon in a moment of inspired lunacy produced a wife of this name for his hero, announcing his momentous discovery in print in 1752. Windmill Street near Piccadilly he concludes quite rightly to have been called after an actual mill—but he goes on to assume that as windmiils sometimes stood on barrows, a barrow therefore existed in Piccadilly Circus in which the king of the Trinobantes was buried![21] Such instances may have an almost pathological interest to the student of mental aberrations—to those who respect Stukeley's earlier work they are pathetic.

He died in 1765 at the age of 78, being at that time rector of St. George's, Queen's Square, Holborn. His work during the ten years from 1718 shows him to have been the finest field-archaeologist that England had so far seen or was to see for a century; for the next thirty-five he was instrumental in propagating theories the very imbecility of which seems to have endeared them for ever to the public mind. Who shall apportion praise or blame to so contradictory a character?

[20] ANTIQUITY, 1933, VII, 49–60.

[21] MS. entitled *Knaves Acre*, written *c.* 1760 (A.K.)

Kells, Durrow and Lindisfarne

by F. C. Burkitt

Professor of Divinity, University of Cambridge

In the number of Antiquity which appeared in March 1934 there was an article by Mr A. W. Clapham, the object of which was to show that the Irish art which is exemplified by the ' Book of Durrow ' and the famous ' Book of Kells ' seems to be derived from the Northumbrian art of which the Lindisfarne Book is an example. The popular tradition, at least of the last hundred years, goes the other way : the ' Book of Kells ' is popularly regarded as not only very splendid, but also very Irish. The purpose of what follows is to test and illustrate these views by the evidence of textual criticism. Most of what I have to say will be dreary to the student of art, and *crambe repetita* to the Biblical critic, but I venture to persevere, because I cannot help feeling that the text does throw some light on the illustrations.

I

The Latin Vulgate is a revision made by St. Jerome in the year 383. So far as the Gospels are concerned it was very well received : round about 400, only 15 years from its first appearance, the new revision was officially accepted at Hippo in North Africa, and formed the basis for St. Augustine's critical study *De Consensu Euangelistarum*. But in the course of two centuries the text became much corrupted and mixed with the old unrevised texts of the ' Old-Latin '. Sometimes scribes wrote down the text known to them, substituting, for example, the Old-Latin *cotidianum* in the Lord's Prayer for Jerome's *supersubstantialem* ; more often the mixture came by correcting a codex of the Old-Latin to the new revised version, but imperfectly. The result must be classed as a text of the ' Vulgate ' but with Old-Latin readings occurring here and there, and such mixed texts tended to become the leading exemplars for a whole region. Besides this many small changes were made by careless scribes, and in spelling many copyists followed the style current in their own country.

Speaking generally, the texts current in the old Christianized countries were the most mingled, those introduced by more recent missionaries, such as Augustine, were the purer. The English had a Vulgate text from the beginning, but the Britons in the 5th century had only partly assimilated their Old-Latin MSS to the Vulgate, as can be seen by the quotations of Gildas. Augustine had brought over codices of the

Vulgate: the Corpus Christi Gospels (quoted as X) may be one of those he brought with him. It has a good, but not a very good, Vulgate text.

Benedict Biscop founded the monastery of St. Peter at Monkwearmouth in 674 and of St. Paul at Jarrow in 682. He was succeeded by Ceolfrid. The two foundations were only about six miles apart, and were so much under the same government that it is not even possible to know at which place the library was situated, or whether the books went from one to the other. About 678 Benedict Biscop had made a fourth journey to Italy, in the course of which he purchased some valuable books. They are described by Bede, and from his description it is clear that Codex Amiatinus (A), now in the Laurentian Library at Florence, was copied at Jarrow or Wearmouth from the books bought by Biscop and taken by Ceolfrid on his journey to Rome to present to the Pope, no doubt, as a specimen of the standard attained by his monks in the extreme limits of the civilized world.

Codex A is the leading MS of the Vulgate. Its text in the Gospels is especially valuable: there is some reason to think that it represents the text approved by Cassiodorus for his monks at Vivarium in the south of Italy, and that it was derived from a MS possessed by Eugipius, abbot of the Lucullanum (now the Castel dell'Uovo near Naples), which was believed in 558 to have belonged to Jerome himself.* That this text should have been taken to Northumbria and survived there is a strange historical accident, but it carries with it the rider that all books with real affinity to the Gospel-text of A have a Northumbrian origin.

II

That the famous MS known as the Lindisfarne Gospels, now in the British Museum (Cotton, Nero D iv, generally quoted as Y), is Northumbrian needs no demonstration. It was written by Eadfrith the successor of Cuthbert, and illuminated by Oethilwald, afterwards bishop of Lindisfarne (from 725). From 676 the Irish monks had gone away from Lindisfarne, and the monastery was run on the lines of Jarrow and Wearmouth. In text the Lindisfarne Gospels (Y) is almost identical with A: in handwriting and illumination it is one of the finest examples of what is commonly described as 'the Irish school of writing'. The object of this article is to determine by what right this school is called 'Irish' at all.

The three other MSS, of which I here have to speak, are the Echternach Gospels, the Book of Durrow, and the Book of Kells. The

* J. Chapman, *Notes on the early history of the Vulgate Gospels*, pp. 28, 41.

Echternach Gospels (cod. *Epternacensis*, B.N. 9389, quoted as *ept*) is a MS of the 8th or 9th century, copied, apparently from a very old exemplar, at Echternach near Trèves by an Irish monk. The readings in the margin (*ept*^{mg}) and the spellings are Irish, but the first hand of the text (*ept**) generally supports A and Y. In Abbot Chapman's opinion, with which I agree, ' the agreements with AY against the Irish look like survivals rather than corrections '.

The Book of Durrow (Trinity Coll. Dubl. A 4.5, quoted as *durmach*) is a MS of the 8th century, decorated like the Book of Kells, but with less colour. The Book of Kells (Trinity Coll. Dubl. A 1.6, quoted as Q), is a MS of the 8th century, probably. The decorations include human figures, done with a stiffness which contrasts curiously with the beautiful freedom and accuracy of the interlaced and spiral ornaments.

III

To illustrate the texts of AY, *ept* (with margin), *durmach* and Q, I give a few readings to illustrate their affinities. The sign ,, means ' agrees with AY '.

	Matt.	AY	*ept**	*ept*^{mg}	*durmach*	Q
1.	II 4	sciscitabatur	,,		,,	,,
2.	16	pueros	[*hiat*]		,,	infantes
3.	III 1	in diebus autem illis	[*hiat*]		*om.* autem	in illis diet.
4.	17	complacui	[*hiat*]		,,	bene compl.
5.	V 1	autem	,,	+ihs	,,	+ihs
6.	VII 2	metietur	remetietur		,,	remetietur
7.	IX 12	medico	,,		,,	,,
8.	38	eiciat	,,		,,	,,
9.	XII 31	spiritŭs autem blasphemiae	,,		,,	spiritūs autem blasphemia
10.	XVII 14	genibus prouolutis	,,		,,	,,
11.	15	filii mei	,,		,,	filio meo
12.	XXVI 17	*om.* die	*hab.* die		,,	*hab.* die
13.	39a	transeat	,,	+a me	+a me	+a me
14.	39b	sic ut tu	,,	+uis	,,	+uis
15.	75	plorauit amare	fleuit amare		amarissime fleuit* fleuit amare**	amarissime fleuit
16.	XXVII 44	fixi erant	crucifixi sunt (*solus*)		crucifixi erant* *om.* cruci *durm*^{corr}	crucifixi erant
17.	49	Helias liberans eum	,,	Hel. liberare eum	,,	Hel. et liberaret eum. alius autem accepta lancea etc.
18.	65	custodiam	,,		,,	milites

In this short list I have included several readings, like II, 4 *sciscitabatur*, IX, 38 *eiciat* (for *mittat*), to show that even Q preserves genuine Vulgate readings against all Old-Latin evidence. My chief object is however to exhibit *durmach* as presenting a text half-way between the pure Northumbrian of AY and the much more characteristically Irish form of Q. Wordsworth and White in editing the Vulgate decided not to use *durmach* (the Book of Durrow) regularly, regarding it apparently as a mixed text, which it is. But from the point of view of the origins of Y and Q this mixture is extremely important. Here is a MS purer in style than Q and almost equal in its elaboration, which has a purer text of the Vulgate than Q, the purer element being akin to Y (and A). Does it not suggest that as its text is akin to Northumbria, so also its decoration is akin too ? What is more, this Northumbrian text was itself a stranger, imported by Biscop from South Italy. Its adoption, or partial adoption, by the scribe of Durrow suggests that he may have been rather an innovator in art than a perfecter of an immemorial native tradition.

IV

The actual history of MSS cannot be entirely inferred from their text alone. Perhaps my view about these famous Gospel codices, Lindisfarne, Durrow, and Kells, can best be stated in a few paragraphs of conjecture.

The history of Lindisfarne (Y) we know. In the late C. H. Turner's opinion it was actually copied from a MS, of which a fragment survives in the Durham chapter-house library (A II, 17, foll. 103–11). In any case it is the brother of Cod. Amiatinus, the parent of which was brought by Benedict Biscop from near Naples. There is nothing ' Irish ' about it, except on the supposition that its art must be called Irish.

Durrow (*durmach*) is very much like Y. Its text is not pure Northumbrian, but very much like it. Its immediate ancestor must have been corrected to the AY text. I have an impression that it was not like *ept*, an AY text which has suffered Irish contamination, but the other way round. In an inscription found in it the scribe says *qui hoc scripsi . . . euangelium per xii dierum spatium*. No one could have have written the Book of Durrow, with its beautiful spirals and interlacings in this short time, but it would suffice to correct an Irish text to near the AY standard.

Kells (Q) has an ' Irish ' text, like DELR and *gat*, that is to say a Vulgate text, much contaminated by inferior readings of uncertain

origin. But Q is not absolutely bad. It does often side with the best MSS, and the spellings Moses (for Moyses) and Caiaphas (for Caifas) do rather suggest Northumbrian influence. Just about the time when Q was written—it was doubtless written at Iona itself—Roman customs were coming in at the great Scottish (*i.e.* Irish) monastery. Adamnan had already adopted the Roman tonsure before 700. The nearest source for Roman ways was Northumbria : among such ways may fairly be counted large-size human figures, which are found in Q, but not in *durmach* or in Y. There is nothing to suggest that Q was written in Ireland itself : no doubt it was taken from Iona to Kells, where the monks retired when they deserted Iona.

V

One final detail may be noted as an indication of Northumbrian (*i.e.* Italian) influence in Q. Greek MSS are written with the upright strokes thick, the horizontal strokes thin. This is done by keeping the right elbow close to the body, as we were taught by governesses. But Latin scribes inclined to stick their elbows out, and this was also done by unfettered folk like the Irish, who stuck their elbows out still more. Consequently real Irish MSS, like the Book of Armagh or the Book of Mulling, have their upright strokes thin, and any thickness comes in horizontal or slanting strokes. Now Y, *durmach*, and Q, all have their downstrokes thick, and therefore their scribes' right elbows were brought in close to their sides. I cannot help believing that they had been taught to write in the classical way, the way that both Celts and Teutons have always in their hearts so disliked.

The Flint-Knapping Industry at Brandon

by Rainbird Clarke

DESPITE the obvious analogies between the ancient and modern flint industries of Britain and the equally obvious gaps in the continuity of their evolution, neither archaeologists nor economic historians have stooped to elucidate the problems of what it has become a platitude to call ' The World's Oldest Industry '. The flint-knapping industry still existing at Brandon for the production of gun-flints has alone among the flint-knapping industries of Britain been described with any degree of adequacy. A bare record survives of the former existence of a score of similar industries but the majority is unrecognized and neglected. The student of the question today has as much cause to bemoan the paucity of data as did Beckmann, who wrote in 1814 ' Many of my readers will perhaps be desirous to know in what manner our gunflints are prepared. Considering the great use made of them it will hardly be believed how much trouble I had to obtain information on the subject '.[1] The magnitude of the dumps of waste products at Brandon at the close of the Napoleonic War provoked exclamations of wonder from contemporary topographers[2], but apparently the first to realize the interest and significance of the Brandon industry was Dr J. Mitchell, who in 1837 communicated his observations to the *Edinburgh New Philosophical Journal*.[3] In 1870 James Wyatt, F.G.S., contributed a chapter on the subject to Stevens' *Flint Chips*, but the classic account from which all subsequent articles derive is that by S. B. J. Skertchly, of H.M. Geological Survey. His monograph, written in 1876 and published by the Survey as a special memoir in 1879,[4] with all its faults describes the technique of the industry in

[1] *History of Inventions*, 2nd edition, IV, 611. Writing on the subject in his ' Cyclopaedia ' in 1819, Rees mentions French sites by name but preserves a politic secrecy with regard to Britain, mentioning no single site. (See article ' Gun Flint, in Technological Mineralogy ', vol. XVII).

[2] *Excursions in the county of Suffolk*, 1818, I, 99.

[3] XXII, 36–40.

[4] ' On the Manufacture of Gun Flints', 1879. (District memoir of Geological Survey of England and Wales).

greater detail than any other publication. The almost complete lack of documentary records (the ledger book of the Brandon Gunflint Company from 1838 to 1848 and two books of accounts for 1806 are the exceptions)[5] and the entire absence of archaeological excavation have succeeded in obscuring all but the most recent stages in the evolution of the industry. In other of the flint-knapping industries our knowledge is confined to the record in some local directory of the cessation of their operations, or to the discovery on the surface of undated waste products or, more rarely, of finished gunflints and strike-a-lights, debris of an extinct industry.

No attempt will be made in this article to give a minute description of all that is known of the knappers of Brandon, their history, their methods of work and their products. It will consist of a short historical introduction explaining the relation of the Brandon industry to similar industries elsewhere and considering Skertchly's claims for the continuity of the prehistoric and modern flint-working at this site. This will be followed by a technical description of the flint mines and the processes of the manufacture of gunflints with brief notes on the numbers of the knappers, their vocabulary, their output, the prices and markets for the finished article, and the by-products of the industry.

The distribution of flint industries is controlled primarily by the geological occurrence of the mineral, and secondly by the existence of a population requiring flint for building purposes. The relatively smaller bulk of strike-a-lights permitted an increasing divergence between the market and the site of the manufactory. When flint was required for building it was more often the knapper than his material that was exported. Even now the Brandon knappers migrate to the scene of their labours, using local material for their purpose. It is impossible to plot the distribution of the strike-a-light industries of Britain, for the introduction of the gunflint effected a complete re-orientation and obscured the earlier development of the industry. It would be incorrect to regard all the gunflint industries of which we have knowledge, as the descendants of those strike-a-light industries which existed at the time of their transformation, for in East Anglia at least, several industries can be shown to be late offshoots from Brandon in the heyday of the gunflint manufacture. It is probable that every manufactory of strike-a-lights having access to flint of the requisite quality, that is, homogeneous,

[5] The first in the possession of Mr F. Edwards of Brandon to whom the writer is indebted for this information, and the others in the possession of Mrs Snare of Brandon. He also wishes to express his indebtedness to another knapper, Mr V. Edwards.

free from fossils, and almost lustreless when fractured,[6] soon engaged in the lucrative business of gunflint manufacture when this branch of the arms industry developed.

Yet the manufacture of strike-a-lights continued alongside that of gunflints, for the latter are to some extent a substitute for the former, but the gunflint remained the senior partner in the combine. The manufacture of gunflints is recorded from Turkey, Egypt and Morocco, from Albania, Sicily, Italy (Vicenza), Holland and Spain (Galicia). At first rough pieces of convenient size were fitted in flint-locks, then with the general use of this fire-arm by the beginning of the 18th century a demand arose for more precise and durable flints. This bred a demand for the skilled labour essential to their production. It is thus in 1727 that we find the Hanover War Chancery sending workers to England to learn the trade. In Germany the troops of the Duke of Brunswick first used flint-locks in 1687, a year later than the English forces which adopted it in the year of Monmouth's rebellion. In France the first regular manufactory was established in 1719 though flint-locks were already in use. In the 18th century the flints from Champagne and Picardy were so excellent that a ban was placed on their export. At this time the Dutch are seen purchasing vast stores of flints and drawing the customary large profits in their capacity of arms racketeers. More is known of the processes of French gunflint manufacture than that of any other site except Brandon, and the parallels and divergences are equally remarkable. They will be considered in discussing the problem of continuity at Brandon. Eight hundred men are said to have been employed in the manufacture at Lye, Couffy, Meunes and Noyers in the year 1800. As late as 1870 gunflints were made at Romantin, St. Aignan, Lye and Meunes, the majority at the last named site.

In Britain the cretaceous formations of East Anglia, the Downs and Salisbury Plain account for most of the known sites of gunflint manufactories. In Suffolk those at Cavenham, Tuddenham, Mildenhall (near Wild Street) and Icklingham are probably to be regarded as outliers of Brandon. Indeed the superior quality of the flint at Icklingham caused the knappers to abandon Brandon from about 1846 to 1850, although they returned to Brandon at the end of each week. When difficulties arose over stone-raising all the knappers retired to Brandon save one who continued till 1874. The sites in Norfolk at Weeting

[6] For microscopic photographs of flint sections, see Report of Smithsonian Institution, 1897, part 1, plate 16.

PLATE I

LINGHEATH FLINT-MINES, BRANDON, SUFFOLK

The flint-pits have been worked for over two centuries. They are sunk fairly close together, and each is surrounded by its tip of excavated chalk. Ashley, the last surviving miner, is standing by a heap of nodules extracted from the adjoining pit

Ph. Dr E. Cecil Curwen

facing p. 40

LINGHEATH FLINT-MINES, BRANDON

Ashley, with his peculiar pick. The pick, hammer, spade and crow-bar the only tools used

Ph. Dr E. Cecil Curwen

PLATE III

FLINT IN SITU AT END OF 'BURROW', LINGHEATH FLINT MINE, BRANDON
Ph. Rowland Clark

PLATE IV

FLINT MINER'S PICK AND HAMMER, LINGHEATH, BRANDON
Ph. Rainbird Clarke

LINGHEATH FLINT-MINES, BRANDON

The mouth of one of the pits from which Ashley has brought up a block of flint. No ladder or tackle is used

Ph. Dr E. Cecil Curwen

PLATE VI

BRANDON FLINT-KNAPPING WORKS

Edwards quartering a block of flint, *i.e.* breaking it into smaller pieces suitable for striking flakes from. A heavy steel hammer is used and a leather knee-pad

Ph. Dr E. Cecil Curwen

EDWARDS STRIKING FLAKES FROM THE EDGE OF ONE OF THE 'QUARTERS', THUS PRODUCING A CONE-CORE. NOTE THE TWO FLAKES DETACHED

Ph. Dr E. Cecil Curwen

PLATE VIII

FRED SNARE KNAPPING FLAKES ACROSS AND GIVING A SECONDARY TRIMMING, CONVERTING THEM INTO GUN-FLINTS

Ph. Dr E. Cecil Curwen

(Botany Bay) and Catton[7] on the outskirts of Norwich owed their existence to emigrants from Brandon, as did in all probability that at Whitlingham where, it was declared in 1887, they were made until recently.[8]

The manufacture of gunflints at Thetford is doubtful but flints from Brandon were counted and stored there about 1880. In Essex there were workshops at Gray's Thurrock and Purfleet, where it ceased apparently about 1837. In Kent there was activity at Crayford, Chislehurst (during the Peninsular War it is alleged),[9] Greenhithe, Northfleet,[10] Lewisham and Maidstone where the quarries contained only one stratum of suitable flint. In south Wilts intermittent operations were carried on at an open air flaking and knapping site at King Manor, Clarendon, near Salisbury, though there seems to have been no regular manufacture.[11] Dr R. C. C. Clay has published a site at Broadchalk, Wilts.[12] He regards the implements published by the Rev. H. G. O. Kendall[13] as of Iron Age date as being gunflints. This would add to the company of gunflint manufactories Butser Hill, Hants, and Figsbury (inner ditch),[14] Laverstock Down, Hackpen Hill, Dean Hill, and Juniper Down, in Wilts, and other sites. Mr R. H. Chandler has published three sites near Eynsford, Kent, and furnished a similar explanation.[15] An isolated industry is at Beer Head, Devon (undercliff on the west side) where the stress of the Napoleonic War led to the production of gunflints from material obtained from a landslip. This ceased before 1835. At Glasgow gunflints are also said to have been made from imported stone.

Dazzled by the revelations of neolithic methods of flint mining revealed by the excavations of Canon Greenwell at the neighbouring site of Grimes Graves, Skertchly may be pardoned for assuming continuity between the prehistoric mining and knapping industry there and the similar modern industry in the same area. Before examining his conclusions it is necessary to set out his train of argument. He traced an evolution from the discoid scraper with bulb of percussion regarded by him as of Neolithic date, to the Old

[7] Ceased, *c.* 1878–9. H. B. Woodward, *Geology of England and Wales*, 2nd ed., 420.

[8] This site is probably identical with that at Trowse listed by W. G. Clarke, *Norfolk and Suffolk*, 1921, 120.

[9] W. Johnson, *Folk Memory*, 1908, 231.

[10] Extinct before 1837.

[11] Wyatt, in *Flint Chips*, 1870, 588.

[12] *Antiq. Journ.*, 1925, v, 423–6 (5 figs.)

[13] *Antiq. Journ.*, 1925, v, 158–63.

[14] Ceased over a century ago.

[15] 'Some supposed Gun Flint Sites'. *P.P.S.E.A.*, 1918, II, 360–5.

English strike-a-light and thence to the modern gunflint and strike-a-light. According to this view the gunflint was only a modification of the present strike-a-light. The modern square form of strike-a-light was introduced from France and is known as the ' Frenchman '. He further stressed the similarity of the round-headed English iron flaking-hammer, superseded by the French hammer only at the end of the 18th century, with prehistoric hammer-stones. Both ancient and modern knapper undercut the sides of their implements. In the sphere of mining Skertchly noted a similarity between Grimes Graves and the shafts now worked at Lingheath near Brandon in ' several remarkable particulars '. He emphasized the point that at both sites a number of pits were sunk close together to exploit the ' floorstone '. There existed too an additional parallel in the method of working. Both drove burrows about 36 feet long into the chalk and both ' drew ' the flint in semi-circular apses and when the shaft was exhausted filled the old workings with chalk. After referring briefly to the use of a hollowed cup of chalk as lamp, and now as candle-stick holder, Skertchly plays his last card with a touch of triumph, pointing to the obvious descent of the modern one-sided pick of iron used at Lingheath from the miner's antler in the Neolithic shafts. He added that this pick was made only at Brandon as are all the tools of the modern flint-knapping industry.

This formidable argument for the continuity of flint working and flint-mining at or near Brandon attracted the attention of the anthropologists, and in 1879–80 the Anthropometric Committee of the British Association reported on the physical characteristics and racial affinities of the inhabitants of northwest Suffolk. It was declared that ' several portraits from that locality have been mistaken by competent judges of physiognomy for Welsh. The inhabitants contrast strongly in the colour of their hair and eyes with the population of other parts of the country '.[16] Very dark hair and eyes evidently predominated. When however it came to inferring that the technical vocabulary of the modern miners and knappers provided an intimate link with ' pre-Aryan language ' a re-examination of the facts was obviously desirable.

At the outset it may be stated that Skertchly's typology of strike-a-lights and gunflints was formulated in the absence of any but the most nebulous links between Bronze Age scrapers and extremely modern specimens of the classes mentioned. Such a morphological sequence

[16] Reports (J. P. Harrison), 1879, 400–1 ; 1880, 158–9, 626–7. See also J. Beddoe, *Races of Britain*, 1885, 254.

is devoid of value in the absence of accurately dated intermediate types. Skertchly's claims in this respect assume an even more doubtful air in view of the radically different genealogy propounded by the late Fred Snare, a knapper celebrated for his knowledge of the history of his industry. He controverted Skertchly's view that the modern gunflint and strike-a-light were collateral descendants from Old English strike-a-lights by pointing out that those of the straight-heeled variety of horse-shoe pattern are not English but a French type still made on the Continent in 1908 and sold in Valencia.[17] In his opinion the strike-a-light of the 16th century was rudely oval in shape, evolving into a circle and later into a square preserving a slightly uneven curve at the sides. From this the square gunflint was born. In his comparison of the ancient and modern mines Skertchly has been guilty of selecting his evidence. From the most cursory examination a fundamental contrast is apparent. The minute shaft of the modern mine with its prominent stagings and its crisp angles bears little superficial resemblance to the broad open stageless pits at Grimes Graves. In addition no reference was made to the crooked galleries in the Neolithic mine and the straight burrows at Lingheath, or to the relative position of the ' floorstone ' to the galleries which are situated above this stratum at the former and below at the latter site. At Grimes Graves no chalk was removed from below the flint bed. Further, at Lingheath the knapping sites are not in that close proximity to the mines apparent at Grimes Graves. When all due subtractions have been effected from the volume of evidence adduced by Skertchly in favour of his thesis it must be admitted that the balance of probability is still in his favour. This conclusion is reached after a consideration of (1) the French knapping industry ; (2) the continuity of the use of flint ; (3) the anthropology of the knappers.

A study of the modern French mining and knapping industries can be commended to those who would argue that the analogies between ancient and modern flint-working at Brandon are fortuitous, resulting from the geological similarity of the mining sites and the physical similarity of the flint. In respect of all the parallels noted by Skertchly at Grimes Graves and at Lingheath the French practice is dissimilar. Further the square-headed French flaking-hammer is in contrast to that formerly in use at Brandon, while the practice of undercutting gunflints is unknown, the ' heel ' being chiselled and not cut.

[17] W. Johnson, *Folk Memory*, 1908, 190.

The continuous production of flint tools till the Iron Age and possibly later is a commonplace. In East Anglia the squared flint facing of the town walls at Caistor-by-Norwich and St. Albans, and at the Saxon Shore fort at Brancaster among others, testify to continued activity in the Roman Age, while strike-a-lights in Saxon graves[18] carry on the story to the Middle Ages when a thousand churches rise with rich flush work ornamentation. In all probability the intricate geometric designs of the church of St. Michael's Coslany, and the precision of the Bridewell facade at Norwich are the handiwork of Brandon knappers. The strike-a-light and the gunflint bridge the gap with the 20th century.

In the sphere of anthropology may be noted a curious restriction of the practice of both mining and knapping to a few families, while intermarriage between these groups is more than common. The five generations of knappers in the ancestry of one of the modern knappers may account for his unusual skill.

To sum up, the evidence for a continuity of flint-mining and knapping at or near Grimes Graves and Brandon is strong, though not so conclusive as Skertchly asserted. Many gaps must needs be bridged, many stages in the evolution explained, before the homogeneity of the industry can be admitted. Meanwhile it may be conceded that Brandon enjoys and exploits a pedigree as convincing as any product of genealogy and can rest assured that only the spade can dethrone it from its high estate.

The raw material for the Brandon industry is now obtained from chalk and stone pits within a 40 miles radius. Only a small proportion is derived from the peculiar flint pits on Lingheath, $1\frac{1}{2}$ miles southeast of Brandon. Since about 1720 Lingheath has been the predominant, though not the exclusive, source of supply for the Brandon knappers. Mining persisted till the late 19th century at Santon Downham[19] and Icklingham[20] in Suffolk and at Weeting in Norfolk. The Icklingham pits were worked till about 1874 though none were open in 1876. Their number is estimated at 500, and they are situated in a circumscribed area on Seven Trees Breck about $1\frac{1}{2}$ miles north of the village. Icklingham and Lingheath mine-sections are similar. On Bromehill, Weeting, south of Grimes Graves, deep pits were sunk reaching the

[18] *e.g.* at High Down, Sussex. Evans, *Ancient Stone Implements*, 1897, 314.

[19] Near the main Thetford-Brandon road.

[20] Section in Geological Survey Memoir: *Parts of Cambridgeshire and Suffolk* (*Ely, Mildenhall and Thetford*), 1891, p. 45. To save expense of cartage the last knapper, Ashley, quartered and flaked stone at the mine-head.

' floorstone ' at 35 feet. There are also pits at Santon, Norfolk[21] and in and around the Elms Plantation, Brandon Park.[22] Skertchly suggested that the latter were worked out before the Lingheath pits were sunk and are possibly earlier than the gunflint trade. The source of supply for strike-a-lights is unknown, but it is possible that the shafts of older pits have been overwhelmed by blown sand.[23]

Sandy Lingheath is honeycombed with pits from Brandon Park on the west to the slopes of the Little Ouse Valley in the east (PLATE I).* The shafts now open are in the southeast corner of the area. When the pits near the river, known as the ' Fleet ' pits, were exhausted, mining operations followed the flint seam southwards and westwards to the heath, the pits becoming ever deeper. On Lingheath today hundreds and perhaps thousands of crescent-shaped mounds of grey and disintegrated chalk dominate the landscape. In June 1934 two pits were open—one was exhausted and a fresh shaft was being sunk by the last flint miner, Ashley (PLATE II). With this attenuated labour supply it is obviously inequitable to regard as typical all the conditions of contemporary mining. Consequently a generalized description of the conditions of mining prevailing during the last century will be given although the account of the construction of the shaft is based on the measurements of the present writer in June 1934. Where a divergence occurs Skertchly's figures will be quoted.

A pit is begun by excavating sand and gravel from an area 10 feet long,[24] 3 feet broad and the same deep. The miner then digs down 5 feet in the centre, producing a cavity 5 feet by 2 feet at the bottom of this stage by undercutting the sides. A further stage is left at every 5 feet 6 inches, alternate stages being orientated north and south and those intervening east and west. The mouth of the shaft is oriented so that the last stage or ' Two ' shall face the midday sun. The depth of the stages varies from 5 to 6 feet, the two exceptions being the first and last of the series, the bottom stage sometimes attaining 9 feet. The dimensions of the stages are controlled by the necessity of admitting

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[21] Shallow shafts only 13 feet deep near Blood Hill tumulus, and in the eastern arm of the former Half Moon plantation.

[22] About one mile north of Shaker's Lodge.

[23] The classic example of a sandstorm for this district is described in the Geological Survey Memoir cited, p. 89, and in *Phil. Trans.* 1668, no. 37, 722–4 (T. Wright) (abridged 1809, II, 264–5).

* We are much obliged to Dr E. Cecil Curwen for the photographs which he permits us to reproduce.—EDITOR.

[24] Nine feet is more usual.

the miner's body and of raising the flint to the surface. In comparison with Neolithic mines they show a tendency to reduce to a minimum the ' dead work ' involved. The average dimensions of the shaft are 3 feet by 2, and the depth in this case from the surface to the bottom of the burrow or gallery was 43 feet 6 inches.[25] The sides of the shaft are undercut to the extent of about 3 feet in every 15 of depth. This sinking ' on the sosh ' as the miners term it, is to protect them from the weather and to prevent accidents from falling stones.[26]

At the bottom of the shaft the last stage is extended 3 feet horizontally and then the main burrow is driven at right angles for about 36 feet, terminating in an apse called a ' draw '. The burrow is 7 feet wide and 2 feet 3 inches in height, while the apse measures 12 feet in diameter with a maximum of 2 feet 6 inches vertically. The next shaft will be sunk so that it pierces the roof of this apse.[27]. The geology of the mine can be seen from FIG. 1. Pits communicate only when the flint is good. This section may be regarded as standard except that an additional stratum[28] or ' sase ' of flint termed the ' Upper Crust '[29] occurs in other pits between the Topstone and the Wallstone. Formerly trial pits were sunk 10 feet below the floorstone to a stratum of ' rough and smooth blacks '. The former were fit only for ' common ' gunflints, but the latter were of good colour, clean cutting and of excellent running quality. They occurred too sparingly to be remunerative and difficulties with water led to the abandonment of the enterprise. The seams of flint are irregular nuclei rather than continuous layers, and in consequence one or more of these strata may be absent. The flat bottomed floorstone (PLATE III) is always burrowed for and is generally but not always continuous. When over 1 foot thick it is grey in the middle. The Wallstone, always continuous, is of good quality, being generally black though sometimes it is grey or spotted. It is burrowed from above. When present, the Upper Crust is taken out only in excavating the shaft and is not burrowed for unless in great demand as building stone. The toppings are burrowed from beneath in filling in the pit. Flint is extremely variable in quality and in constancy of colour. Some flint quite black *in situ* may crack and change to a milky tint in the course

[25] Skertchly's shaft was 37–38 feet in depth.

[26] In this connexion we cannot forbear quoting the miner's remark that he ' never sank stunt, but under-ran his two by bubber-hutching on the sosh '.

[27] Skertchly's ground plan of a mine is idealized.

[28] ' Horns ' occur also occasionally below the Wallstone.

[29] Not in the section shown in FIG. 1, opposite.

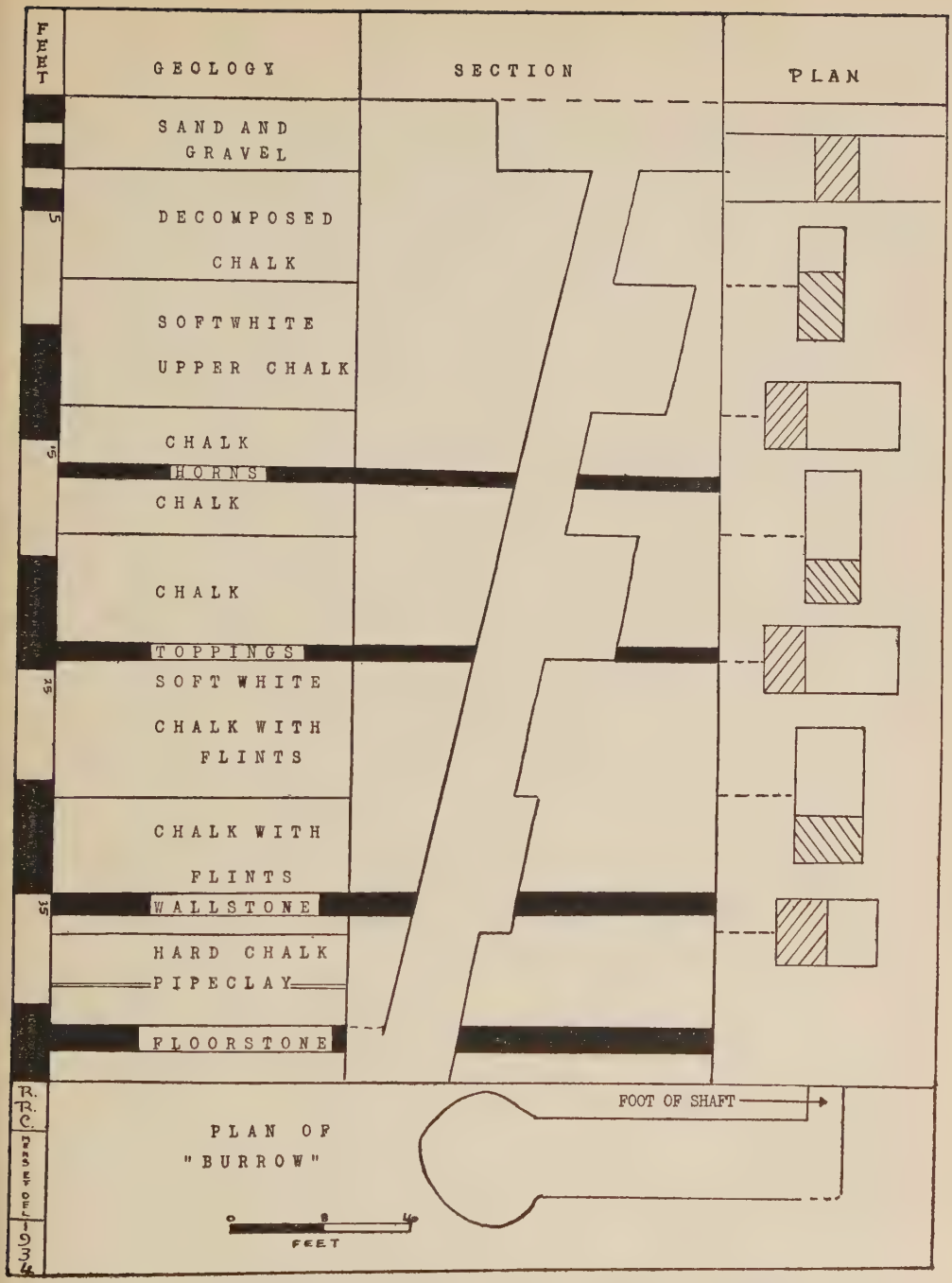

FIG. 1. DIAGRAM SHOWING STRUCTURE OF MODERN FLINT-MINE, LINGHEATH, BRANDON

of an hour, owing to sun and wind, while other flint is unaffected by exposure to weather. An average time for digging a pit of this depth is one month, and if the flint is of fine quality will take six to nine months to exploit. Only a portion of the excavated material is brought to the surface, the flint and chalk from the first ' draw ' being raised. The chalk is heaped at the head and the flint at the foot of the pit. When the pits intercommunicate the fine material from the new burrow is deposited in the old.

The flint miners or stone diggers use the peculiar one-sided pick already referred to, a heavy iron hammer, a shovel and a short crow-bar (PLATE IV). The pick is used to cut the chalk and clear it away from the stone. The iron hammer weighing 5 to 7 lbs. is employed to break up the flint into blocks weighing from 2 to 16 stones. The overhanging sides of the shaft, which can be compared to a well, a chimney and a newell stairway, prevent the sky from being seen at the bottom, and operations are carried on by candle light. No windlass rope, pail, or ladder is employed in these pits (PLATE V). The miner himself ascends and descends by a series of footholes or ' toes ' in the chalky side intermediate to the stages. The flint and chalk are raised three stages at a time upon the head of the miner, who formerly wore the crown of an old bowler hat to protect him. When the miners were more numerous one was stationed at each stage and the flint was passed from hand to hand. The reasons for this non-division of labour are probably the speculative nature of a flint-mine and the absence of sufficient capital for expensive plant. The pits tend to become rounded by the obliteration of the angles. This is accentuated by filling in the shaft with chalk. Formerly when the workable flint was exhausted, the miner received a shilling from the Trustees of the Poor of Brandon, owners of Lingheath, for this labour. In 1908 it was said that the practice of filling in old shafts was in desuetude. A digger can stake out a claim for one pit, begin to excavate another and exploit a third. The miner is his own master. He pays to the Charity Commissioners of the town a royalty or ' groundage '[30] on each plot or ' take ' where a pit is sunk. This charge is transferred to the buyer of flint. The excavated flint is measured in ' jags ', which is the quantity piled on the ground so that when standing on one side the bottom of the flint on the other can be seen. One and a half jags are equivalent to a horse load.

[30] Wyatt, in error, denies the existence of this royalty. In 1837 Mitchell records the miners' complaint against the rent of 5*s* per jag.

The flint is carted from Lingheath to the knappers' workshops near their flint-faced houses in the flint-walled byways of Brandon. The first operation in the manufacture of 'gunflints' is termed 'quartering' (PLATE VI), the dressing of the rough flint preparatory to flaking. The knapper, wearing a leather apron, places on his left knee, protected by a tightly bound leather pad 6 inches by 12, a large nodule of flint which may vary in weight from a quarter to nearly two hundred weights. If the weather is damp the moist flint is first dried round a fire. A large or small hammer is employed according to the size of the nodule. The first or large quartering-hammer is hexagonal in section. Its composition is iron, faced with steel and weighs about 5 pounds. The second or light hammer weighs about $3\frac{1}{2}$ pounds. Worn hammers are preferred. The knapper taps the flint at a suitable line of cleavage, and by the sound knows where to strike. If the hammer falls dull and jumps, the stone is double-coated or of mixed colour beneath the coat. If the stone is cracked, it flies to pieces. If on the other hand the coat is hard and the flint sound the hammer rings. The nearer the crust the better the flint. The blow is given from the elbow and the hammer is allowed to fall from above on the natural upper crust. No force is used. It is essential for flaking that a square edge be produced. There is no regularity in the pieces struck off but they average about 6 inches square.[31] A small 'old English' hammer is used for squaring flint for building purposes.

The second and most difficult process is flaking (PLATE VII). For this, an oval hammer of native design was formerly employed until it was superseded by the French flaker now in use. Diverse legends as to the date and manner of its introduction are in circulation, but the most probable is that it was introduced by French prisoners of war at the time of the contest with Napoleon, when Brandon supplied the whole British army with gunflints.[32]

In order to produce flakes of the required shape and quality the stone must be struck at the proper angle at the exact spot with the

[31] Mitchell, 1837, terms the quarterer a 'cracker'.

[32] Mitchell, p. 38, alleges that the French mode was introduced into England by James Woodyer, of Kingsdown between London and Maidstone, who died *c.* 1780–90. Probably French methods reached Brandon some time after their use in Kent. Skertchly's legend is that the flaking-hammer was introduced from France, probably during the war of the Spanish Succession by a prisoner called Pĕro. By 1927, the version had it that the name of the incarcerated knapper was Freuer who, at the conclusion of hostilities returned to Brandon, married, and founded the family of knappers, the Frewers. (Rogerson, *Blackwood's Magazine*, April 1927, p. 528).

correct force. A large or small hammer is used according to size. The heavy hammer can strike longer flakes than the light one. The longitudinal section of the steel flaker is rhomboidal. The centres of the sides are flattened to strike off irregular projections on the quarters. The faces measure $\frac{1}{2}$ by $\frac{1}{8}$ inches and the whole weighs from $1\frac{1}{4}$ to $3\frac{1}{2}$ pounds, according to its condition and size. When worn the faces are filed down. The tapering shaft enters a hole of such slight diameter as to prove its unsuitability for delivering a heavy blow without breaking. The object of the hammer is not heavy percussion but the concentration of the greatest possible weight with the least possible volume. The handle is not for momentum but for precision in striking. The quarter is held against the leather knee-piece at an angle of 45°. The hammer is raised 2 inches from the elbow and light blows are dealt to the surface. If the flake is to be thin the blow falls just inside the face of the hammer, if thicker slightly further in. The outside flakes, 6 inches long, an inch wide and with two ridges are removed, leaving a rough polygonal shape. The next set of flakes are struck a little to one side of the previous set. The flakes run so as to include the angles or ribs of two of the first flakes and are thus double-backed. The perfect flake should have a flat face, even edges and parallel ribs, but this is possible only with good stone. Single-backed flakes are never struck intentionally, but unless flakes were of different sizes much waste would ensue. The flaker works round the quarter, removing two or three rows according to quality. Only the flaking hammer now in use can produce double-backed flints, the old English hammer producing only ribless flakes. If the flake is of good quality it is dropped into either the ' best tub ' for double-backed or into the ' common tub ' if it is single-backed. If defective it is cast into the chip tub and eventually goes to swell the heap of chips outside the workshop door. The cores are relegated to the ' builder tub '. Formerly a fifth tub the ' little-'untub ' was used to contain small flakes for apprentice boys to practise on.

The last stage in the manufacture is the conversion of the flakes into gunflints by knapping (PLATE VIII). The knapping hammer is an old cast steel file 9 inches long, and half an inch by a quarter inch in section. This requires tempering and the edge must be kept square by filing and often only lasts a fortnight. The knapper sits at an angle to a wooden block, generally the bole of an oak, in which a stake of soft iron 6 inches in length and 1 inch square at the shoulder is embedded about 4 inches from the edge. This stake is set slightly oblique and

is surrounded by leather to give resilience. The stake is a small anvil, against the edge of which the gunflints are shaped and trimmed. Its height, termed the ' fall ', varies with the type of gunflint. The block slopes toward the knapper, who, resting his elbow in the groin, grasps a flake, and with the thumb and forefinger of the left hand holds it on the stake, bulb of percussion downward. With his right hand the knapper taps the flake to get the hammer square. While the arm remains motionless, his hand moving from the wrist swiftly and flexibly taps the flake, which breaks crisply into as many as four sharp-edged squares if the flint is good. The flake is struck just inside the stake. The motion of the hand is kept up continuously on the leather stage while the knapper picks up a fresh flake. Three edges of the gunflint are trimmed, as the flake is turned in an anti-clockwise direction and the fourth is completed after the flint is struck from the flake. This trimming of the gunflint is a distinctive feature. Between 1838 and 1848 French gunflints with their ' gnawed ' heels were sent to Brandon to be trimmed at a cost of one penny each. As quickly as he makes them the knapper disposes of his products. With unerring precision he casts each gunflint according to size into one of the heterogeneous collection of tins, pails and buckets around him. It is remarkable that a knapper blindfolded can detect a gunflint of his own workmanship.

Before selling his products the knapper must count them. The tins are emptied and the flints laid out on a table. Five flints are counted at a time by drawing 3 with the right hand and 2 with the left, and each group thus numbered is termed a ' cast '. Five hundred a minute is an average rate while an expert can in this way enumerate 20,000 an hour.

A study of the numbers employed in the flint industry at Brandon is of some interest as a register of the vicissitudes of war and peace and the march of invention during the last century. The industry was the mainstay of the working classes of Brandon during the first three decades of the 19th century. During the Napoleonic War it is said that 200 were employed. Shortly after 1832 the percussion cap superseded the gunflint and the friction match supplanted the tinder-box. That this double progress paralysed the industry can be seen from the decline in the number employed by 1837, then computed by Mitchell at 70 or 80. This depression and the sale of the last consignment of gunflints to the British Government in 1838[33] did not damp the enthusiasm

[33] Not 1848, as Rogerson, p. 531.

of the munition makers who in the same year[34] induced 70 or 80 persons to purchase £25 shares in a Brandon Gunflint Company. By 1846 trade seems to have revived sufficiently to employ 100 men, but the revival was only temporary for in 1848 the company appears to have failed, perhaps because of the rivalry of the East India Company which had a factory in the town. Just before the Crimea War the last large scale order was executed—a matter of 11,000,000 carbine flints to Turkey, our ally. At this time about 10 men were employed in each workshop.[34] From the total in 1868 of 36 knappers in regular employment besides the 20 miners at Lingheath, there was a decline and then a revival which a decade later stabilised the numbers between 30 and 40. This lasted till the South African War when a brisk trade sprang up in tinder-boxes,[35] for the climate during certain seasons of the year rendered matches almost useless. The cessation of armed conflict was indicated by the reduction of the numbers in 1907 to 17 knappers and 5 diggers only, 3 of whom were in permanent employment. The Great War dealt a death blow to the industry. The knappers not on active service at first achieved success by marketing ' Allies ' patent lighters at fourpence each until the imposition of a duty. By 1924 only 7 knappers remained and now but a shrunken remnant persists—1 in continuous and 2 in intermittent employment, while a septuagenarian miner still excavates in the style of his forefathers.

It has been said that the decay of the industry was due not to the falling off in demand but to an increased distaste for engaging in the trade. The knappers' shop was regarded as too confined and agriculture was preferred. This is only partially true. The knappers have foreseen the inevitable decline of their handicraft and have adopted more lucrative means of livelihood, but the primary impetus has come from dwindling orders. Skertchly scouted the legend of the knappers dying before the age of 40 from consumption caused by the inhalation of flint particles. Although some seem immune from its ill-effects the facts do not corroborate Skertchly's statement. Of eight men in one workshop seven died in early manhood while one father and three sons all died from the same complaint in four years.

In view of the extravagant claims advanced by Skertchly a note on the technical vocabulary of the miners and knappers may not be out of

[34] In 1858 one wholesaler and 7 flint-makers controlled the industry. In 1868 three masters employed 36 employees.

[35] Tinder-boxes contained a trimmed flint, a small bar of steel and a woven fuse neatly packed in metal box. Each box was as serviceable as its bulk in matches.

place. Apart from the expressions already mentioned the following are unusual. In mining ' fleet ' denotes proximity to the surface in a vertical sense, while ' gain ' indicates the same horizontally. Decomposed chalk is termed ' dead lime ', ' paps ' or ' horns ' are protuberances of flint, and ' hobbly ' is an adjective with similar connotation. ' Gulls ' are the large blocks of flint rarely found under the floor-stone. Natural hollows are ' gulper ', ' potholes ' in the chalk are dubbed ' shitholes '. Flint coloured like the rock of Gibraltar is ' gib ', doubtless coined by some digger-soldier. Where pillars are left to support the roof the epithet ' jarm (jamb) ' is applied. In knapping twisted flakes are called ' wrung ', while a flake which does not ' run ' is ' dub ' and ' bruckly ' if it will not flake easily. Meal-times are ' dockey ', also used in the Fenland. The ' tellers ' are those employed for counting the gunflints. The persistence of French terms in the book-keeping of the industry is remarkable. Gunflints are quoted ' per mille ', while the phrases ' pierres a feu ' and ' fusee flints ' are current. Most of the knappers' vocabulary, it need hardly be added, is local dialect.

Walter Johnson records the use by the knappers of a system of conventionalized symbols in book-keeping. Although this system is unknown to the present generation of knappers, products of universal education, there seems good authority for its use among some of the illiterate knappers till the late 19th century. The only numeral employed in the notation is 7, because it is shaped like a pick it is alleged. All other numerals are combinations of the symbols x, I and -. Examples of this obsolete method are given below.[36]

The output of the gunflint industry has naturally varied with the fluctuating conditions of peace and war but the output per knapper per unit of time has altered little during the period for which statistics exist. A knapper of average skill can produce from 5,000 to 7,000 flakes in a day, while an expert has struck as many as 10,000 in the same time. Flints can be knapped at the rate of 300 per hour, though slightly more have been completed by knappers of outstanding proficiency.[37] This daily total of 2,500 gunflints is exclusive of the flakes used as raw material. As the same knapper produces both, due allowance must be

[36] I after x = 100; — = ½ of any number preceding it; xii — = 1250; xx7— = 2750; 1111— = 450; 𝍸 = 5; X𝍸 IIII 7𝍸 = 1975; o = £; Θ = 10/-; I = 1d; — = ½d; x = 10; I = 1/-; jag = ⌓ (W. Johnson) ⌒ (W. G. Clarke); ⊂ = ½ jag.

[37] The varying numbers given in earlier accounts are due to differences in the length of the working day.

made in calculating the total putput. One flake of average size is converted into two large and one small gunflints. In 1868 the total weekly output was 200,000–250,000 gunflints. Even in the relatively prosperous period from 1880 onwards the totals had sunk to 80,000 for the same time. By 1913 this had been reduced to one quarter, though occasionally those exported reached the level of 40,000 per week. At present, the maximum is 23,000 per week, a figure far remote from those of the early 19th century when from one workshop alone no less than 10 tons of gunflints per week were exported.

The prices of gunflints vary with the size and the quality of the flint and with the demand for this munition of war. During the Napoleonic War, the price per thousand rose to £2 2*s*, with the consequence that the knappers are reputed to have played pitch and toss with guinea pieces. The depression in the thirties cut the price to 8*s* and the general decline reduced this by half—a level at which it rested for half a century. At the same period the raw material cost 6*s* 6*d* a jag if it was floor-stone ; an additional 1*s* 8*d* was paid for groundage and 1*s* for cartage. 12,000 gunflints could be made from one jag of excellent stone and 6,000 from ordinary quality.

The nomenclature of a gunflint can be seen in FIG. 2. The classification depends on four factors—size, quality of the flint, use of double or single-backed flakes, and the existence of a single or double edge, in the latter case there is no heel. The standard sizes are termed musket, carbine, horse-pistol, large gun (double-barrel), small gun (single-barrel), pocket pistol.[38] Other sizes and appellations have had a transient currency. The quality of the flint is denoted by the adjective, ' best ' or ' superfine ', ' seconds ' or ' common '. The latter term covers a variety of colours—such as chalk-heel, mixed grey or spotted. ' Seconds ' are thinner than ' bests ', but of inferior workmanship or colour. ' Seconds ' and ' commons ' are single-backed. Double-edged gunflints are longer than single-edged of the same size. Double-backed are smaller than single-backed. It is obvious that an extremely wide range of products was possible. The variety of tinder flints was more limited. A gunflint of musket size can be utilized as a strike-a-light, the former contrasted with the latter having transverse in place of longitudinal ribs.

Large stocks of gunflints have to be kept as formerly orders came for as many as 2,000,000. When counted, the flints are packed in

[38] ' Large swan ' and ' Long Dane ' are among the uncommon sizes.

bags, and then in barrels or kegs. At one time gunflints were sold in the market place at Brandon, but the knappers preferred to cut out the buyers and sell direct to the merchants. The flints were then exported from either London or Liverpool. In 1870 the chief markets were South and North America, the Cape of Good Hope and the African Coast generally, New Zealand and Spain. Russia and Turkey had been exploited till recently. In 1884 Africa was undoubtedly the most extensive market, absorbing four million per annum. In 1907–8 Austria, China, Tibet and Oceania appear among importers, while sales were pushed in Java, Sumatra, Borneo and the Malay Archipelago.

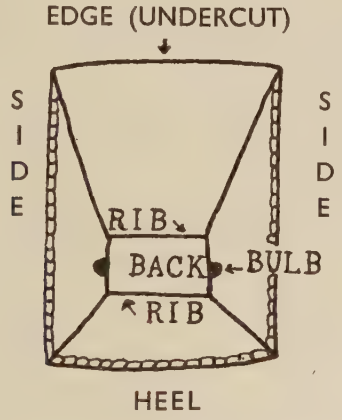

Fig. 2. GUNFLINT NOMENCLATURE: MUSKET SIZE

By the end of the Great War, West Africa and the Malay Peninsula area alone remained. At present, pistol gunflints (no. 2 size) are sent to Lagos, Nigeria ; carbine (no. 4) to Kumassi, Ashanti and Calabar ; and musket (no. 5) to Bangkok, Siam where they are probably used as tinder-flints.

In 1907 strike-a-lights were sold in South America, Spain and Italy, and to tropical travellers. The price was one penny each. Tinder-flints are no longer manufactured.

The by-products and waste-products of both the mining and knapping industries are of no little interest, especially to the archaeologist. Beside their major occupation of manufacturing gunflints for the victims of unscrupulous gun-running the knappers still produce squared

flint-facings for churches and domestic structures. The cores resulting from flaking are squared or rounded up and used for building purposes. In 1876 these sold at 4*s* per 100. A very considerable trade in building flints existed at Brandon about 1904. Formerly the chalk blocks from Lingheath were used for rough walling. The waste products from flint-knapping consist of flakes of irregular shape or of outer crust besides the chips resulting from the knapping process proper. The immense heaps which in 1818 ' would astonish a stranger on account of their magnitude ' were still to be seen in 1876, although thousands of tons had been used on the local railways or had been dumped on Lingheath to fill up the mine shafts. Some of this waste was for a time utilized in pottery calcining and in the manufacture of china. Garden paths and roads assisted in the disposal of this cumbersome debris, which in bulk was about equal to the raw material. It has been estimated that the finished gunflints absorb about 13 per cent. of the total, building stone about 34 per cent., and the remainder is waste. Today the waste cannot be disposed of.

But it is for the fabrication of implements of flint that the knappers have earned notoriety in the eyes of prehistorians, for though arrowheads, axes and scrapers of Brandon make rarely deceive an expert they are calculated to entrap the unwary amateur. Besides the production of copies for museums, the knappers also make ground and polished axes from cement, chalk and burnt umber coated with soda and then with gum shellac. The prehistorian owes a deep debt of gratitude to the knappers for initiation into the mysteries of flint working.

Among the many *tours-de-force* of the most cunning flint workers may be mentioned the production of fish-hooks with which perch have been caught in the Little Ouse ; the fashioning of the alphabet in flint, and the creation of a necklace of flint bangles struck from solid discs of flint with infinite labour and patience.

Such is the Brandon flint-knapping industry of today. What of the morrow ? We fear that the manufacture of these munitions of war can only look forward to a peaceful death in the near future. With the more general use of breech-loaders and the perfection of cartridges for the tropics, the demand for gunflints will cease and with that the supply. This unique domestic industry is already languishing into decay. Soon it will perish and be numbered among the byegone handicrafts of rural England, leaving only the tradition of the age-long secrets.

Etruscan Tombs*

by D. Randall-MacIver

SINCE the great International Conference held at Florence in 1928, when so many of the wider problems of Etruscan archaeology were discussed, there has been a general tendency, especially marked among the younger writers, to concentrate upon intensive studies of detail. The seven volumes of the admirable *Studi Etruschi* and, in a less degree, the annual publications of the foreign Schools and the Italian Academy are full of excellent monographs upon such matters as the sculpture, painting or pottery of a given period or place, or upon any other minor department of the whole far-reaching subject. These are of real value as contributing to build up the entire fabric, but they are naturally too specialized to have any appeal for the general archaeologist.

The casual reader might suppose at first from its very modest title that Åkerstrom's *Studien* amounted to no more than another of these minor works of limited scope. This would be a total misconception. It is a work of wide range and one of the most important of recent contributions to the systematic arrangement and chronology of Etruscan archaeology.

The development of tomb-structure is indeed traced from its earliest beginnings down to the 1st century B.C. on not less than 20 sites scattered all over Etruria. But *pari passu* with the architecture we are given a brief but masterly critique of the extant theories for each individual place, which results in a comprehensive review of the whole archaeological history. It would be impossible to praise too highly the industry, acuteness, and critical judgment of the author. He is profoundly well read and he has also studied the actual ground with an attention which lets nothing escape him. In his writing he has included the results of all the most recent research in every quarter.

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* *Studien über die Etruskischen Gräber.* By Åke Åkerstrom. Uppsala, 1934. Pp. 203, with 18 plates and 25 figures.

The result is seen in a book, which, though not large in bulk, must be regarded as an indispensable supplement to all the more general works written a few years ago.

The difficulties of undertaking a systematic account of this kind can only be fully appreciated by those who have attempted a similar adventure. There are vast lacunae in the material; there are also labyrinths filled with rubbish. After more than 20 years we are still kept waiting for the publication of Veii. Though the excavations of Caere have been remorselessly carried on for ten years or more, the material from them, which might well fill two volumes as large as Dr Woolley's monumental books on Ur, has never been described except in a brief semi-popular article suitable to a shilling magazine. It is therefore inevitable and in no way a discredit to our author if his chapters on Veii and Caere appear to be sketchy, and are quite incommensurate with the importance of the subject. It is even remarkable that they do after all succeed in establishing one or two points.

It is with the third chapter, on Tarquinia, that he begins to show his mettle. Out of such paltry stuff as the letters and maddening résumés in the early *Annali* and *Bulletins*, the chit-chat of the egregious Mrs Gray and the haphazard remarks of early travellers, eked out by verbal traditions preserved by the workmen or the reminiscences of a disastrous Syndic, he has miraculously put together a complete mosaic. Tarquinia becomes a new thing, suddenly complete in its main lines even if the minor details are lost beyond recovery. Incidentally the location of the ancient city is successfully established. It was situated, not, as most writers have supposed, on the site of the present town of Corneto but on the Piano della Regina.

The treatment of Vulci is good if somewhat brief. Here one could have wished for more detail, but doubtless the author has used all that was relevant to his immediate purpose. Possibly he was a little diffident of encroaching upon a subject pre-empted by Messerschmidt.[1] It would be an excellent thing if one or other of these exceptionally acute researchers would put together a really complete and comprehensive account of everything to do with Vulci, omitting no part of its almost uniformly disgraceful history, in which Gsell's work marks the only bright moment. It might even be possible to make the Campana collection something more useful than parlour decoration. A commentary on Canina's entire *Etruria Marittima* would be most useful. In

[1] *e.g.* in *Jahrbuch des Instituts, Ergänz*, heft 12.

the present chapter I note the wise caveat against accepting the Polledrara tomb in the British Museum as anything like a ' closed deposit '. It seems very doubtful whether it can be used at all as a dating point. Here is an opportunity for someone to come to its defence, if defence is possible.

The development of tomb-structure, to consider the subject which gives its title to the book, is to a great extent conditioned by the local geology. This standpoint, long maintained by Orsi, is well kept in view by Åkerstrom, who devotes a chapter to an outline of the geology of the ancient province. In the volcanic section of southern Etruria, where the soft tufa can be carved as easily as Bath stone, it is natural that subterranean chambers should be cut in the rock whenever a large space was required. This explains the comparatively early origin of the elaborate chamber-tombs of Caere and Tarquinia. They have evolved from the earlier form of a mere corridor roofed over, of which the Regolini-Galassi is a standard example. Such corridors were at the outset no more than extensions of simple *fosse* or trench-graves, covered, as our author shows, by small tumuli. The enlargement which produced the *camera* or chamber tomb was occasioned by the increase in bulky tomb-furniture when the Etruscans rapidly became wealthy.

Outside the volcanic area the history of tomb-construction is different. It was due to the refractory nature of the local stone at Vetulonia that architecture was retarded in that district, and ultimately took the form not of subterranean chambers but of large structures of masonry. These tholos tombs such as the Pietrera and the Diavolino are described with penetrating analysis. It seems impossible to connect them, as is so often and so plausibly suggested, with the tholos graves of Southern Crete. As for any borrowing of architectural ideas from Asia Minor in the 7th century our author very properly rejects the idea and gives his reasons briefly but in crushing form—which will probably not deter other writers from resuscitating a frequently exposed fallacy.

The rock-cemeteries of the Viterbo district, *viz.* Bieda, S. Giuliano, Norchia, Castel d'Asso as well as the neighbouring Sovana form a small and homogeneous class. They are discussed in special chapters with some illuminating remarks. It is to be noted that in no case do they go back earlier than 600 B.C. Their carved temple-façades and doors show much resemblance to similar buildings in Lycia and Paphlagonia, which is due in all probability to the fact that each borrowed from Greece. Let me add, on my own account, that the theory of an immigration of the Etruscans from Asia Minor is strong

enough to dispense with the most unwelcome aid given by those who mishandle the architectural evidence.

In dealing with the sites of Vetulonia, Populonia, and Marsiliana, the author has advantages which were not available in the case of Tarquinia. He is no longer obliged to scavenge for his material in the dust-heaps of an unscientific generation. These three places have been carefully and scientifically excavated, the results admirably published, and the whole subject discussed and coordinated by several modern writers. Here then we are at once enabled to recognize that Åkerstrom is no less competent in criticism than in the reconstruction of evidence. He is careful, temperate and sound, neither revolutionary nor ultra-conservative. It is therefore a pleasure to recognize that he has rightly corrected me in an important point of chronology. He disagrees, very courteously, with my dating of the earliest appearance of oriental imports at Vetulonia, and would consequently bring down the date at which we can detect the occurrence of the first Etruscans on that site by a full half-century. I have long reflected upon this point and have come to the conclusion that he is almost certainly right. The date should be stated as 750 B.C. rather than 800 B.C. I am not, however, prepared to go one step further, as he suggests, and lower it to 725 B.C.

The beginnings of Tarquinia he puts, correctly in so far as the evidence allows of judgment, a generation earlier than that of Etruscan Vetulonia. On his argument therefore Etruscan Tarquinia begins about 750 B.C. Whether this can be accepted as an absolute dating depends upon the view taken of that most difficult question the 'Warrior's Tomb'. The highest dating for that tomb which now finds any general acceptance is 800–750 B.C. The reasons for preferring 750 B.C. are here carefully set forth, but we must proceed cautiously and for the present I would say no more than 'sub judice lis est'.

Much of the argument for chronology in this book depends upon the debated date of the foundation of Cumae. Not that Åkerstrom falls into the common error of supposing Cumae to have been the sole or even the principal channel of oriental commerce; he is too clear-sighted for that. But as we know the *relative* chronology of Cumaean pottery very well, and this pottery is synchronous with oriental imports, the establishment of an absolute date is very important. He decides for 750 B.C., virtually the same decision that I made some years ago when I argued for 740 B.C. I believe this to be almost exact and cannot haggle about 10 years. The pre-Cumaean geometric pottery found in

Etruria he believes virtually to overlap with the earliest Cumaean. On this matter the evidence must be very carefully scrutinized before any decision can be made. Before leaving this subject however it must be said that Åkerstrom's account of the whole, vitally important, question of the geometric pottery in Etruria is the clearest and most consistent that has been given by any writer.

There can be no doubt that this book irons out many disagreements among other authors, and comes very near establishing a chronological scheme which should be acceptable to all workers in the same field. If there still remains a difference of plus and minus 15 or 20 years at some points, yet this is no more than just that margin of prudence which is desirable in order to allow for reasonable and legitimate differences in interpreting identical material. In many cases even this margin begins to disappear and we are approaching a very fine stage of definition.

It may be pointed out that the publication of this volume is exceedingly timely and appropriate in view of the approach of the second International Congress on Etruscan subjects which it is proposed to hold in Italy in the summer of 1935.

Agriculture and the Flint Sickle in Palestine*

by E. Cecil Curwen

IT does not seem to have been contested, and therefore one may assume that it is generally agreed, that the discovery of the remains of a sickle in an ancient deposit is evidence that its owner knew how to grow corn. The forms that sickles took prior to the use of metal have been ably classified by M. Vayson de Pradenne in an article which was reviewed and summarized in Antiquity in June 1930, and as a result of his work the characteristics of the flint flakes and of their method of hafting as sickles has come to be widely known and easily recognized.

The first part of M. Neuville's paper discusses the significance of the recent discovery by Miss Dorothy Garrod of flint sickles in a stratified mesolithic context in a cave in Mount Carmel.[1] Her sickle-flakes, with beautifully carved bone handles, occurred as early as the lowest Natufian[2] levels, which our author is disposed to assign to a considerably earlier date than the evidence of agriculture found elsewhere. The problem is—how does this fit in with the prevalent modern view, regarding Europe at least, viz., that the knowledge of agriculture is one of the factors which distinguish the neolithic from the mesolithic or epipalaeolithic ? The natural answer, and the one which the author favours, is that, granted the correctness of the modern view, yet agriculture must have been first discovered in some one locality by people who were as yet living in an epipalaeolithic state of culture. What Miss Garrod's sickles show, as M. Neuville points out, is that this momentous discovery is likely to have taken place in Palestine, and that the knowledge of corn-growing matured locally among an epipalaeolithic people for a very long time before it reached that stage where

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* *Les débuts de l'agriculture et la faucille préhistorique en Palestine.* By René Neuville. Extrait du Recueil de la Société Hébraïque d'Exploration et d'Archéologie Palestiniennes. Jerusalem, 1934.

[1] 'The Stone Age of Palestine', Antiquity, June 1934, p. 133.

[2] The place to which the Natufian and other periods have been assigned in the absolute chronology of the Middle East will be found by referring to the Chronological Table published in Antiquity, June 1932, VI, 185.

it could exert the stabilizing effect which led to the first rise of the most ancient civilizations. It thus preceded by a considerable time all evidence of the other arts of civilization, such as the domestication of animals, the making of pottery and the working of metals. The distinction between epipalaeolithic and neolithic, while useful in Europe, is thus not really applicable in the same way in those lands which formed the cradle of civilization.

The attribution of the scene of the birth of agriculture to Palestine is fully in accord with tradition and with botanical evidence, as pointed out by the present reviewer in ANTIQUITY, 1927, I, 262.

The second part of the paper deals with the typology of flint sickles in Palestine found in stratified deposits ranging from Natufian I to the end of the Bronze Age, when they were ousted by sickles of iron. First of all the author discusses the question of the brilliant gloss that is found on a large proportion of sickle-flints : can it be taken as evidence as to whether a given flint blade has been used as a knife, a saw or a sickle ? He argues that the gloss merely indicates hard usage, the result of friction, and criticizes the present reviewer's conclusions, based on experiment and published in ANTIQUITY, 1930, IV, 184–6, that such lustre is only produced by substances containing silica in their composition, such as straw and wood. Our contention was that sickles could be distinguished from saws by the character of the lustre produced, straw giving a diffuse gloss, and wood merely a narrow band along the cutting edge, because a flint saw cannot bite deeply into wood by reason of its V-section. Bone, moreover, we argued, produces no lustre on flint, because it contains no silica. M. Neuville's objection is partly justifiable because he found, in repeating our experiments, that the degree of lustre produced by two hours work cutting straw could be washed off with water and a brush, and therefore consisted merely of a superficial deposit and was not a true lustre.

But his objections are also partly based on a curious misconception. He assumes that we drew a distinction between lustre that is evenly distributed and that which is striated—an idea that never occurred to us and which certainly finds no place in the paper criticized. Apparently this misunderstanding arose from the fact that our photograph (No. 3 facing p. 182) of the experimental gloss resulting from cutting wood shows a striated appearance which is, however, merely due to the slightly uneven rippled surface of the flake—a fortuitous fact of no significance.

M. Neuville also cites for comparison the gloss sometimes found on the cutting edges of flint celts that have not been intentionally ground or

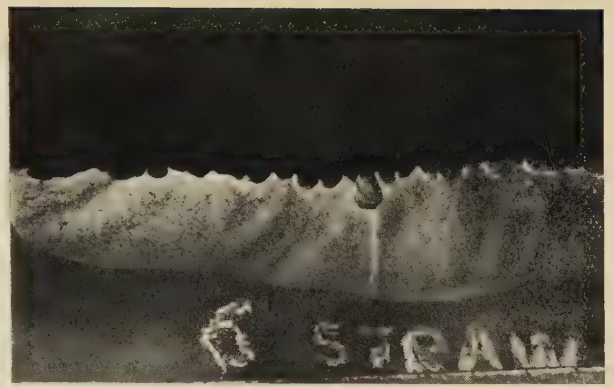
polished—a gloss which exactly resembles that on the sickles but which has clearly resulted from friction in splitting wood. (This is, of course, because a flint axe will penetrate deeply into wood, whereas a flint saw will not). He argues from this that the apparent differences in the lustre on flint blades result only from the degree of use, the quality of the flint, and the fineness of the grain of the flint, and not from the nature or quality of the material cut. But axes are not really comparable with saws and sickles owing to the difference in their mode of use.

As a result of these criticisms we have had some fresh experiments carried out with the kind assistance of Mr D. W. Hudson. In order that the effects of prolonged friction might be determined on two different kinds of flint, cylinders of oak, bone and compressed straw (in the form of strawboard) were spun on an electric lathe, and the flint blades were applied with sufficient pressure to cut into each kind of substance. Two varieties of flint were used, both being in the form of recently struck flakes ; one kind was black flint from Brandon, the other a coarse grey flint from Norwich. In each case the flakes had been given a serrated edge by the late Fred Snare of Brandon.

Two flakes, one black and one grey, were applied for 30 minutes to the drum of strawboard while the latter was revolving at 3500 revolutions per minute, so that at a rough calculation about 10 miles of compressed straw came into contact with the flints. The result in the case of the black flint was to produce a fairly bright lustre, most brilliant on and near the serrated edge, and gradually fading towards the opposite edge. The appearance exactly resembles that on the ancient sickle-flints, but is somewhat less brilliant ; it cannot be removed by brush, water or a grease-solvent such as chloroform. The grey flint proved far less susceptible to polish, for the lustre affected little more than the serrations themselves, but these had their sharp edges thoroughly rounded and smoothed. How much standing corn corresponds to a given quantity of strawboard in regard to its polishing qualities is a ratio that would be hard to determine, but if it be provisionally estimated at 100 : 1, and if we assume that with so small a tool the corn was cut furrow by furrow, then 1000 miles of furrow is contained in nearly 100 acres of corn. It is at any rate obvious that the highly polished flint sickles must have seen very many seasons hard work.

The cylinders of oak and bone were each run for 30 minutes at 2500 revolutions per minute, during which time serrated flakes of black and grey flint were made to cut into them as deeply as possible. Thus in each case about 7 miles of wood and of bone came in contact

1.



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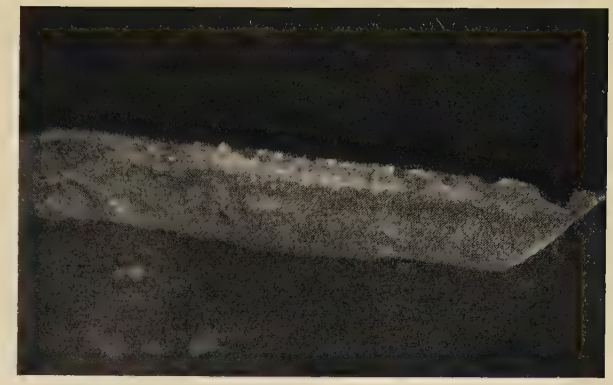

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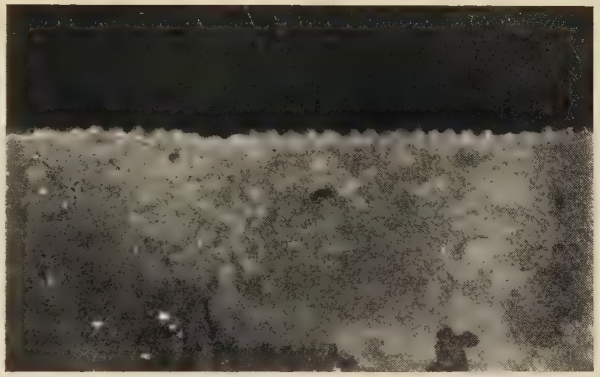

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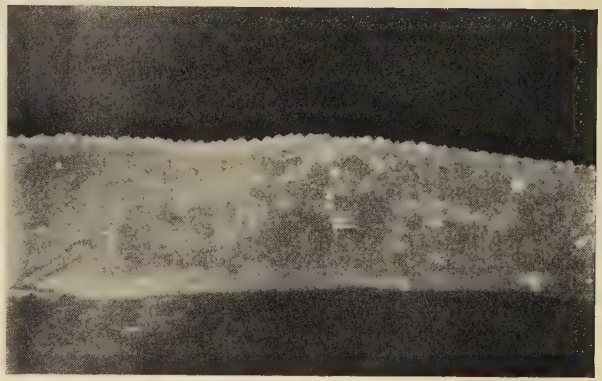
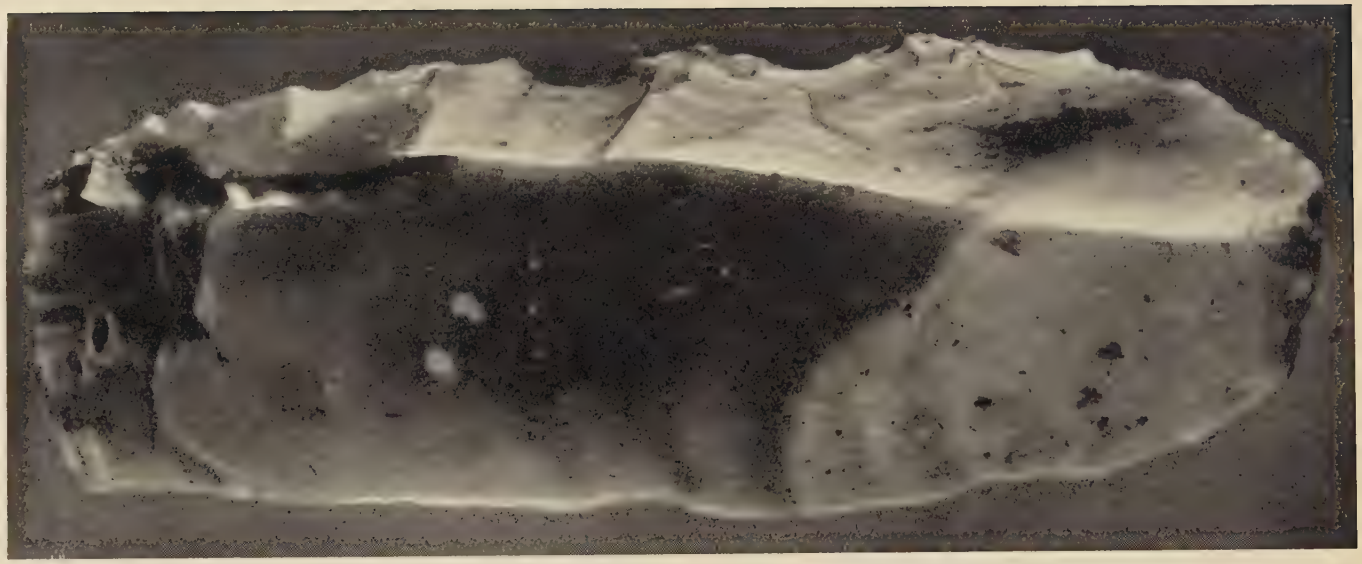


1. BLACK FLINT, AFTER CUTTING ABOUT 10 MILES OF STRAW-BOARD. Note diffuse lustre
2. GREY ,, ,, ,, ,, ,, ,, STRAW-BOARD. Note lustre at base of teeth
3. BLACK ,, ,, ,, ,, 7 ,, ,, WOOD. Note narrow band of lustre
4. ,, ,, ,, ,, ,, ,, ,, ,, BONE. Note no lustre, but some splintering

Ph. C. H. Cobbold. All approx. × 2

facing p. 64



PREHISTORIC SICKLE-FLINT FROM SELMESTON, SUSSEX, SHOWING GLOSS. 2½

Ph. Max Mills

with the flints. In the case of bone a certain amount of splintering of the serrations occurred, but not the slightest trace of polish of any kind, either on the black or the grey flint. With the oak, on the other hand, a narrow, well-defined band of rather dull but very definite lustre, rather less than an eighth of an inch wide, was produced along the cutting edge, more noticeable on the black than on the grey flint, but quite definite in both. Its circumscribed character is in marked contrast to the diffuse gloss produced by straw, and is due to the inability of a flint saw to penetrate deeply into a rigid medium like wood. A flint axe, on the other hand, will penetrate deeply into wood and therefore may receive a diffuse lustre resembling that produced by straw on a sickle-flint.

These experiments, though far from being exhaustive, do surely support the view that the polish on the flint blades is not merely the result of hard usage, but is conditioned by the nature of the material cut ; that the conditioning factor in such material is in all probability the presence of silica ; and that the diffusion of the gloss on the ancient flint blades indicates that this siliceous material must have been of a yielding character, unlike wood. As corn-straw is of this nature, and as such blades are known to have been used in sickles, it seems a safe inference that diffuse gloss on a flint blade is the result of cutting corn or other siliceous grasses.

M. Neuville's classification of flint sickles is based on the examination of very large numbers of examples from stratified deposits, and should prove useful. Points of special interest include the following :

(1) Bone mounts for the sickle-flints appear to be confined to Natufian I. These are finely shaped and carved, and the flints themselves are the most delicately formed in the whole series, the average ratio of length to breadth being $4\frac{1}{2} : 1$. Thereafter we may infer that the mounts were of wood as in the case of the known examples from Egypt.

(2) Coarse serrations first appear on the flints during the Tahunian, which is the phase which intervenes between the end of the mesolithic (Natufian IV) and the appearance of pottery, copper and polished flint in the Ghassulian. The Tahunian also produces the first flint celts.

(3) In Tahunian deposits there are also fairly numerous large flint blades, with lustre from use on one or both edges, and the author suggests that such may have been used as sickles. We would urge that if this lustre is diffuse such use may be regarded as certain.

(4) Fan-shaped scrapers, typical of the Ghassulian (the age of Sodom and Gomorrah), show similar lustre on their edges.

(5) Coarse serrations become usual during the Bronze Age, but are not found in the Ghassulian.

(6) Flint sickles are the only flint work found in Palestine during the middle and late Bronze Ages (2000–1200 B.C.). It is perhaps because the art of skilful knapping was lost that the sickle-flints of this period become large and coarse, short and broad, the average ratio of length to breadth being $1\frac{1}{2} : 1$.

(7) The fine flint blades with corn-gloss on them (one-piece sickles ?) are common only between the 19th and the 15th centuries B.C.

The author complains that excavators on Bronze Age sites pay less attention to the stratification of stone tools than those on prehistoric sites, with the result that it is not possible to determine the evolution of the flint sickle during the Bronze Age on the evidence at present available. This complaint is no doubt justified : the reviewer has met with a similar difficulty in England in regard to the development of querns.

The author is, however, surely wrong in saying that the flint sickle disappeared suddenly on the arrival of the Israelites in Canaan. The date of the conquest by Joshua is now established at about 1400 B.C., whereas it has already been stated that flint sickles continued in use till about 1200 B.C. It was the arrival of the Philistines, bringing iron, that caused this ancient and tenacious form of implement finally to disappear.

To sum up : this is an excellent paper—cautious, moderate and thoughtful ; and being the work of no arm-chair critic but of an experienced field-worker, is well worthy of our confidence.

ADDENDUM and PLATE II

By way of comparison with the flint sickles of Palestine it may be worth while publishing here the photograph[3] of a specimen of an extremely rare type of flint sickle from Britain. It has been recently found in Sussex in circumstances which seem to favour a possible neolithic B (' Peterborough ') connexion; the writer has only seen two other specimens of similar type from the rest of Britain. Their use as sickle-flints is betrayed by the brilliant diffuse gloss which is found on both faces adjacent to the cutting edge.[4]

[3] I am greatly indebted to the Editor for having the photograph specially taken.

[4] The specimen from Selmeston was fully described in the *Antiq. Journal*, XIV. Another example, from Salvington, will, it is hoped, be published shortly, and is in the collection of its finder, Mr Barclay Wills, of Worthing.

The Ancient Maya Causeways of Yucatan

by Marshall H. Saville

American Museum of Natural History, New York

THERE is little room for doubt that the remains of ancient roads or causeways still to be seen in Yucatan are, so far as the history of the peninsula is concerned, of considerable antiquity.* Two of the earliest and most important historians of Yucatan, namely, Diego de Landa and Bernardo de Lizana, mention them, and brief notices of their existence have been made by explorers in the nineteenth century. It seems highly probable that as early as a thousand years ago a broad highway extended a considerable distance across the northern part of the peninsula of Yucatan, if indeed it did not reach from the eastern to the western shores of the country.

When the Spaniards first entered this part of Middle America during the first half of the sixteenth century, they found the country in a state of decadence. They established their colonial capital, to which they gave the name of Merida, on the site of an ancient and important native city called Tiho. To the east of Merida, the town of Izamal was founded on the site of a very important and holy Mayan city known as Ytzamal.

Bishop Landa, writing during the last quarter of the sixteenth century, described the multitude of edifices in Yucatan, noting the extensive groups of Tiho, Ytzamal, and Chichen Itza. Of Ytzamal he noted that ' there is no memory of their builders, who seem to have been the first inhabitants of the land '. He stated also that Tiho and Ytzamal were about thirteen leagues apart, and said ' there are signs even today that there was once a very handsome causeway from one city Tiho to the other Ytzamal '. He further wrote that Tiho belonged to a period as ancient as Izamal. From Bishop Landa's statement we know that the causeway was in a ruined condition 350 years ago. In 1890 the writer saw numerous traces of this road when journeying from Merida to Izamal.

* They are called in the Maya language, *sacbe* or *sacbeob*, plural.

Madame Le Plongeon wrote that they saw between the village of Mucuiche and Izamal, on the left of the road, ' the remnants of the magnificent ancient causeway, carefully built of hewn stones, cemented with mortar, which, at the time of the Spanish conquest, existed between Izamal and T.-Hó (Merida). A great part of this work has been thoroughly destroyed to obtain stones to macadamize the public road '.

A few years after de Landa wrote his history (not known or published until 1864), Lizana, in describing the ' idols which were venerated in the town of Ytzamal when the land was conquered ', wrote concerning the importance of the town in the religious life of the Maya as a place of pilgrimage, saying : ' there they offered great alms and made pilgrimages from all parts of the province, for which reason there had been made four roads or causeways to the four cardinal points, which reached to Tabasco, Guatemala, and Chiapas, so that today in many parts may be seen pieces and vestiges of it. So great was the concourse of people who assisted at the ceremonies to these oracles of Ytzamat-ul and Tiab-ul, that they had made these roads '. Here again we have the statement that the roads were in ruin a short time after the Spanish conquest and trustworthy information concerning their vast extent.

Shorter interurban causeways are found in two sites in Yucatan. De Landa mentions a beautiful causeway leading from the patio of two small edifices on pyramids to the so-called Sacred Well or Cenote of Sacrifice at Chichen Itza. In 1891 my interest in ancient roads was aroused during the months I was engaged in excavation at the ruins of Labna, for I had to cross daily an ancient causeway extending 600 feet from the Palace to the Temple. This road was in an advanced state of ruin, and was not more than 25 feet wide and about 4 feet in height.

During the past years attention has been drawn to the hitherto unexplored city of Cobá, which lies to the eastward of Chichen Itza some seventy miles. From what we now know about Cobá it appears that this place was one of the largest and most important of ancient Maya. In 1842 the famous explorer Stephens, when at the frontier town of Chemax, on the road from Chichen Itza to Cobá, was shown by the cura of Chemax a report which he had drawn up relating to his curacy of Chemax, which included all the territory to the eastward as far as the sea. Stephens copied and translated the portion concerning the ruins of Cobá and the causeway leading from it. In this report is described a large two-story edifice called the Monjas, followed

by the statement : ' from this edifice there is a *calzada*, or paved road, of ten or twelve yards in width, running to the southeast to a limit that has not yet been discovered with certainty, but some aver that it goes in the direction of Chichen Itza '. Stephens adds : ' the most interesting part of this, in our eyes, was the *calzada*, or paved road, but the information from others in the village did not interest us. The cura himself had never visited these ruins ; they were all buried in the forest ; there was no ranch or other habitation near ; and as our time was necessarily to be much prolonged by the change we were obliged to make, we concluded that it would not be advisable to go and see them '.

In later time, Charnay, on his visit to Yucatan in 1880, wrote : ' we also found marks of a cemented road from Izabal to the sea facing the island of Cozumel ', and he places Cobá in approximately its correct position on his map, although he does not mention the site in his text. From a series of letters published in Paris while he was in Yucatan we learn that he planned on two different occasions to go to Cobá, but was deterred by the unsettled condition of the country resulting from the hostile activities of the Chan Santa Cruz Indians.

On the expiration of my work at Labna, April 1891, my friend Don Antonio Fajardo, in Ticul, urged me to undertake a trip to Chemax in order to investigate a great ruined city which he stated was near a large hacienda owned by him, some distance to the east of Chemax. In September of the same year Teobert Maler saw this ancient causeway running to Cobá ; he reached the ruins and made several photographs, but he kept his knowledge to himself, issuing no description of his visit. As Maler lived in Ticul and was on very friendly terms with Don Antonio, it is probable that he learned of the ruins from his neighbour. Hence we see that knowledge of the causeway and Cobá was not confined solely to the Indians. However, only in recent years has it been safe to go into this region, as the Indians of Chan Santa Cruz were in control of the country, and no extensive explorations could have been carried out.

It remained for Dr Thomas Gann to be the first to visit the site, under the auspices of the Carnegie Institution of Washington, in the winter of 1926. In the report on four expeditions to Cobá during that year by different investigators no mention is made of the causeway, but, in his book published during the autumn, Dr Gann speaks of it. He says that the road is 32 feet wide and varies from 2 to 8 feet in height. He first encountered it about 6½ leagues beyond Chemax and followed

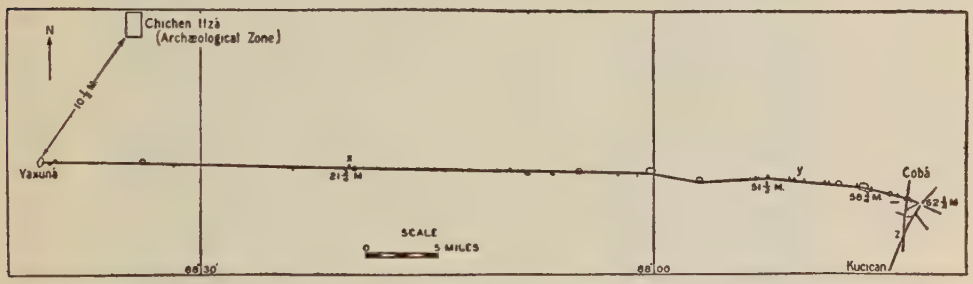
it about 4 leagues towards Cobá. He writes; 'the road represents an enormous expediture of time and labour, involving the quarrying, transport, facing, and building in, of nearly a million tons of stone, and is unique throughout the whole of the Maya area, for though cement covered roads exist in and around many of the ruined cities, no such elevated causeway has been found elsewhere'. Again he writes: 'on each side of the road were great quarries from which the stone used in its construction had been taken. Holes were apparently sunk round the great blocks, in which they built fires, and then pouring water into the red-hot holes, cause the rocks to split, so that slabs of it could be easily dug out. The sides were built of great blocks of cut stone weighing hundreds of pounds; the central part was filled in with unhewn blocks of limestone, and the top covered with rubble, which, as is indicated by the traces of it which remain here and there, was once cemented over . . . It was convex, being higher in the centre than at either side, and ran so far as we followed it, straight as an arrow, and almost flat as a rule'.

A member of the third Carnegie Expedition to Cobá in 1926, was J. Eric Thompson, who has recently published a much fuller account of the causeway. From Thompson's account, published in Spanish, I quote as follows: 'noteworthy are the great number of roads which appear to radiate from the metropolis of Cobá, undoubtedly one of the most important of Maya cities, being only surpassed by Tikal in the extension and number of temples and mounds which it contains. Of these roads, we counted eight, and Indians of confidence who have travelled in the mountains told us of two or three more. They are of variable height, but the great road seen by Dr Gann, which was discovered by the Austrian archaeologist Teobert Maler, has a width of approximately ten metres. Another road which united the city of Cobá with the sacred ward of Macanxoc has, however, a width of twenty metres more or less, but this is exceptional.

The great road called by Dr Gann the Camino Real de Occidente, does not, so far as we could determine, connect Cobá with the ruins of Chichen Itza, but it seems to end at Yaxhuana, a ruin whose architecture very much resembles that of Cobá. It is situated about ten miles south of Chichen Itza. The distance between these two cities is some sixty miles. On account of lack of time and scarcity of water, we were not able to go over the road more than a distance of ten or eleven miles, the road running in a straight line without any curves or deviation due east in the direction of Cobá. In the last half-mile which we

traversed when we were already entering the wards of Cobá the road is divided into two sections : one goes towards the ward of the north called Nohoch Mul, and the other in an extended curve ended at the foot of the highest hill in the city proper of Cobá, situated on the isthmus between the two lagoons of Cobá and Macanxoc. In nearly all the entire road which we traversed it reached an elevation of a metre more or less, but when we came to depressions it maintained its proper level, undoubtedly to contend with the peril of inundation during the rainy season. So that in various places where there are depressions the road reaches a height of three to four metres.

The bed of the road consists of the typical mixture of stones such as are found in ruins of the ancient Mayas ; that is to say, great unworked stones. Above this is a layer of smaller stones held together with a



Drawing to scale of the Yaxuná-Cobá causeway, the greatest of all the causeways of the ancient Maya thus far discovered. This road, 62½ miles long and from 30 to 34 feet wide, was built of stone and surfaced with cement. In March 1933 it was traversed from end to end for the first time in modern days by an expedition despatched by the Carnegie Institution of Washington. The road roller was found at X and the date-inscribed stones at Y. The intersecting roads, shown in the accompanying illustration, are at Z. Sixteen of these great roads centred at Cobá, not all of which are represented in the diagram.

By courtesy of the Carnegie Institution, Washington

mixture of lime and saccab, and over this is a typical pavement of plaster made of lime and saccab which appears to be almost a cement. Of course the floor has been almost completely destroyed. The sides of the road were made of walls of stones roughly squared, and of sufficiently regular size (PLATE I). It seems certain that these walls were formerly covered with plaster in ancient times, but today there remain no signs of it. These roads are much damaged by the great trees whose roots have thrust into the cement, tearing up the stones, and as the trees have fallen they brought up great masses of mixed stones cemented together. Without doubt, however, with only a little repairing these roads would serve well for automobiles.

There is another road which unites Cobá with Kucican, a ruin

which we found some ten miles to the south, and for a number of miles has an elevation of six to seven metres. Near Kucican there are various passages made under the road, constructed with the typical Maya roof of the ancients. These tunnels would permit travellers to go from one side of the road to the other without having to climb over them. A short distance from Cobá this same road joins another which seems to come out from the sacred ward of Macanxoc. The roads connect at an angle of 35 to 40 degrees, and in the angle forming this junction is a small ruined building.

Through the interest aroused by the accounts of this partial exploration of the great Cobá causeway, Captain Robert R. Bennett was led to undertake an expedition to Yucatan to try and follow the road from its unknown western terminus through to Cobá. He set out during the winter of 1930 under the aegis of the Museum of the American Indian. The journey and publication of the results added no important information of this phase of the Maya civilization, representing, as it does, an engineering work of great magnitude. As a later explorer remarks, Bennett asserted that the expedition was successful in ascertaining the destination of the old causeway, but, ' in spite of this assertion he failed to attain his major objective, since he was able to traverse only a small section of this *sacbe*, and was obliged to assume that its western terminus was Yaxuna, as previously suggested by Thompson '. Bennett made a short visit to the ruins of Yaxuna. There he indicated, as the terminus of the *sacbe*, a very high mound with a crumbling temple. In fact the terminus is a small mound without any trace of superstructure.

The real exploration of the ruins of Cobá was accomplished by the sixth Carnegie Expedition, which arrived on the ground a few weeks after the visit of Captain Bennett. From the preliminary report published by the Institution, we learn that 16 *sacbeob* or causeways make the Cobá archaeological zone absolutely unique in ancient America. They range in length from 100 kilometres, to only a few hundred metres, in width from 19 metres to less than 4 metres, and in height from 5 or 6 metres to less than 1 metre.

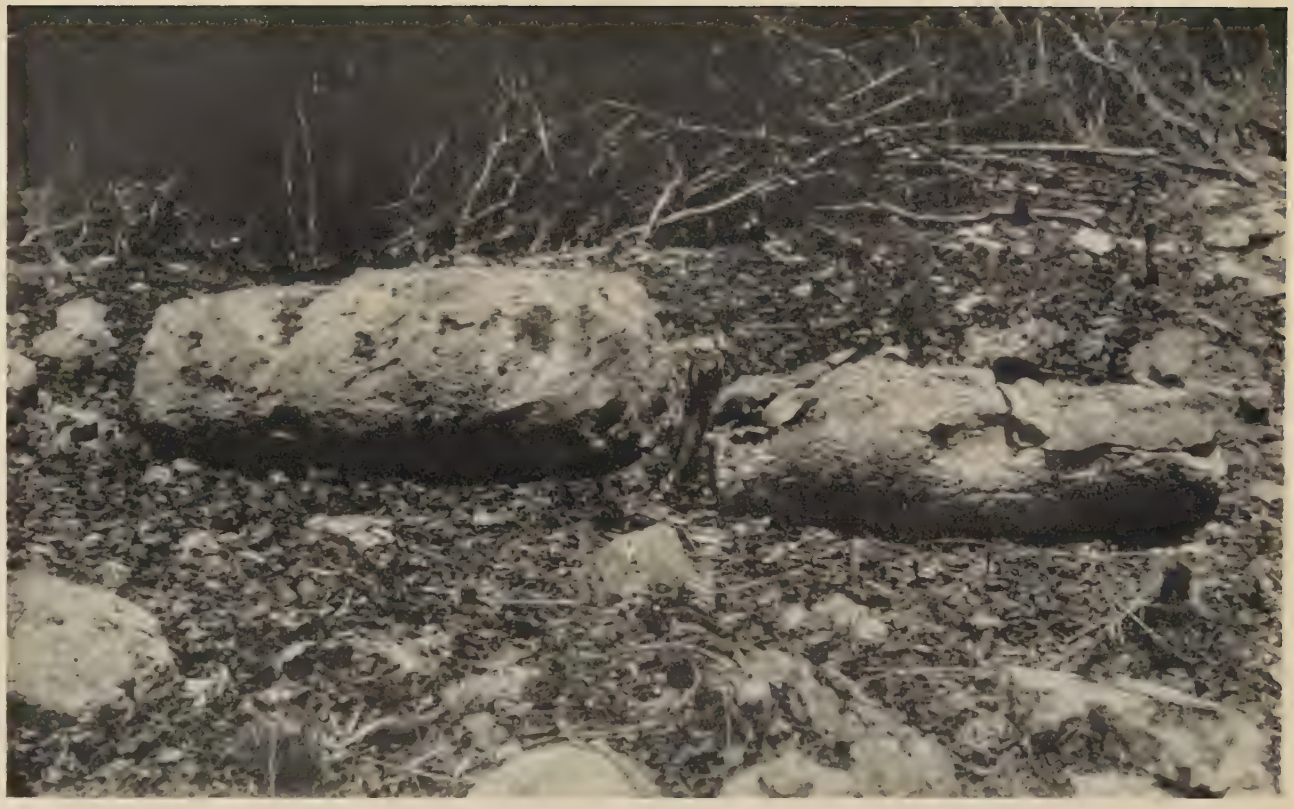
The last, and completely successful exploration which was carried on throughout the entire length of the main road, was made in February and March 1933, by Alfonso Villa R. for the Carnegie Institution. The report, just issued, states that the causeway is exactly 100 kilometres long, maximum height 2.50 metres, average height 75 cm. and average width 9 to 10 metres. It runs in an absolute straight line from

PLATE I

ANCIENT CAUSEWAY OF THE MAYA: SIDE VIEW OF THE YAXUNÁ-COBÁ ROAD, YUCATAN

By courtesy of the Carnegie Institution, Washington

facing p. 72



THE 'FIRST AMERICAN ROAD ROLLER', FOUND ABOUT 22 MILES OUT OF YAXUNÁ ON THE ANCIENT MAYA CAUSEWAY LEADING TO COBÁ, YUCATAN

By courtesy of the Carnegie Institution, Washington

PLATE III

AIR-VIEW OF ANCIENT MAYA ROADS OR 'SACBEOB' AT COBÁ, YUCATAN, SHOWING THE CHAIN OF LAKES

By courtesy of the University of Pennsylvania Museum, Philadelphia. Fairchild Aerial Surveys Photograph

its western terminus for more than two-thirds of the distance. An accurate map was made of the long main road, but the other 15 causeways still remain to be surveyed. An interesting discovery was an immense stone cylinder on one section of the causeway, 4 metres long, 70 centimetres in diameter, and weighing approximately 5 tons. The explorer, rightly I think, assumes that it was used as a road roller for levelling the top layer of plaster which once covered the surface. (PLATE II).

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Note by the Editor

The technical interest of the air-photograph (PLATE III) is considerable. The course of the raised road-causeways is revealed by marks or lines across the top of the tropical forest. These appear to be caused by the fact that the trees growing on the causeway are naturally taller than the others, and by thus out-topping them they cast a shadow and become visible from above. It is not (presumably) because they grow better on the causeway ; the opposite result rather would be expected—that they should be stunted. If my explanation is correct, there is then an essential difference between this photograph and one of a crop-site in England, though at first glance they seem similar—and though the *results* are in fact similar. The same phenomenon was observed, and photographed, by Major Allen in the case of the Wychwood Grim's Ditch near Tomlin's Gate in Kiddington, Oxon. The Maya photographs would have shown the roads better if they had been taken looking into the sun.

'Fossil Tradition' in Stone Implements*

by A. Vayson de Pradenne

Professor of Prehistory at École d'Anthropologie de Paris

WHEN one speaks of tradition, that is to say, of the transmission of human knowledge from one generation to another, one implies that there are two methods by which that transmission is effected—the spoken and the written word; thus one draws a distinction between oral and written tradition.

Nowadays written tradition alone is of importance; but one recognizes that it has gradually replaced that oral tradition which alone existed, as one supposes, in prehistoric times. We wish here to call attention to yet another mode of transmission which certainly played a part, perhaps even an important part, in the Stone Ages, and disregard of which might in certain instances seriously confuse the study of prehistoric archaeology. We refer to the use and imitation by primitive peoples of the stone implements or weapons that had been previously manufactured by the earlier inhabitants of the same region. Thus the style, or some elements of it, may have passed from one period to another —and this logically constitutes tradition—but without involving any direct personal contact between the successive masters of the technique. That technique is transmitted *post mortem* through the agency of objects taken from the soil, which have thereby become the *fossil* remains of the vanished culture. And that is why we call it ' fossil tradition ', making use of an analogy and contrasting it with the processes of oral and written tradition. Even the modern world, with its rare survivals of Stone Age cultures, provides instances of this practice. The natives of Guiana, who no longer make stone axes, collect (or used a few years ago to collect) the axes ground and polished by the pre-Columbian inhabitants, fitting them into their wooden-handled clubs. Examples may be seen in many ethnographical collections[1] (FIG. 1).

* Translated by the Editor.

[1] We are well aware that objects of this kind have often been made in Europe by inserting authentic Brazilian polished stone axes into equally authentic Carib clubs. Monsieur Blin, the well-known collector of ethnographic specimens, used with his usual good-nature and skill to create many such unions for his colleagues. But the ethnographic fact is well established, and existed free from any possible European influence.

Thus, both in the Pitt Rivers Museum at Oxford, directed by Mr Henry Balfour, and in the Horniman Museum in London, directed by Mr Harrison and arranged on similar lines, one can see ancient stone arrow-heads picked up by modern North American Indians who attribute certain magical powers to them, and who make (or made until

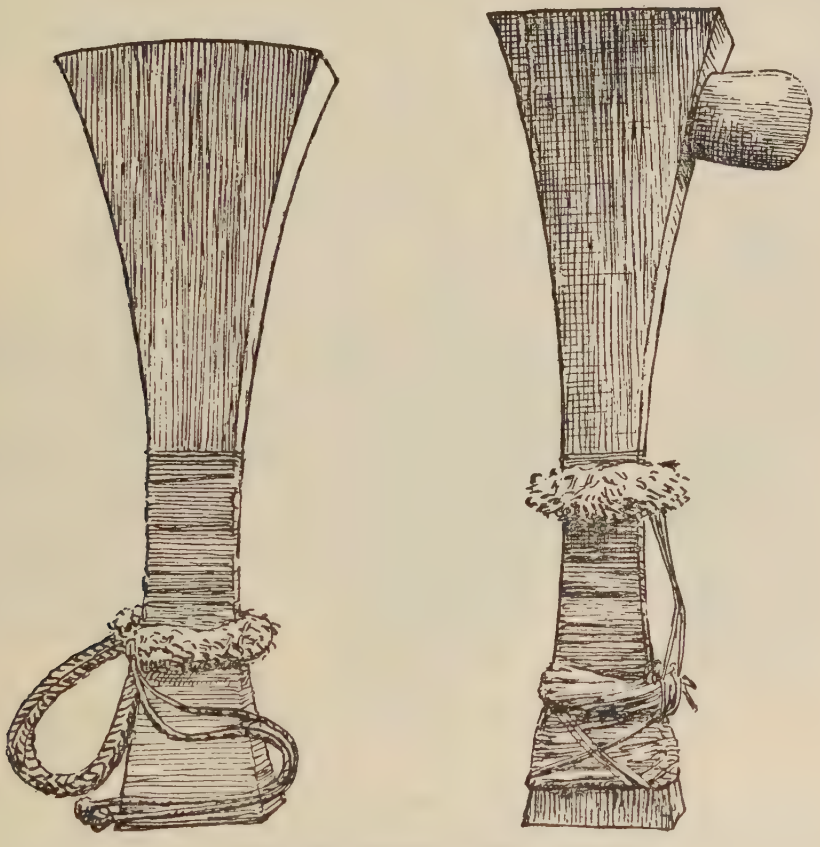


FIG. 1. CARIB CLUBS WITH RECTANGULAR SECTION:
in one the native has inserted an old stone axe. British Guiana: in the British Museum

recently) similar ones for use as weapons. In this case, it is true, living tradition possessed the same technique of workmanship, and fossil tradition was merely added on the top of it, so to speak.

Excavators have for long past noticed and recorded the occurrence in prehistoric deposits of objects with two distinct patinas, that is to

say, of objects that have been re-worked long after their first usage. Thus in the celebrated Mousterian deposit of La Quina (Charente), so successfully and scientifically excavated by Dr Henri Martin, there is a lower deposit specially marked by the deep yellowish patina of its flints. Now Dr Martin has obtained examples of these, easily identified by their patina, from amongst the objects found in the *upper* deposits. They had been re-used by the later inhabitants of the spot, who had lightly re-chipped them, to sharpen the edge or point, but without altering their form. The portions thus re-chipped had acquired the white patina characteristic of the later deposit (FIG. 2).

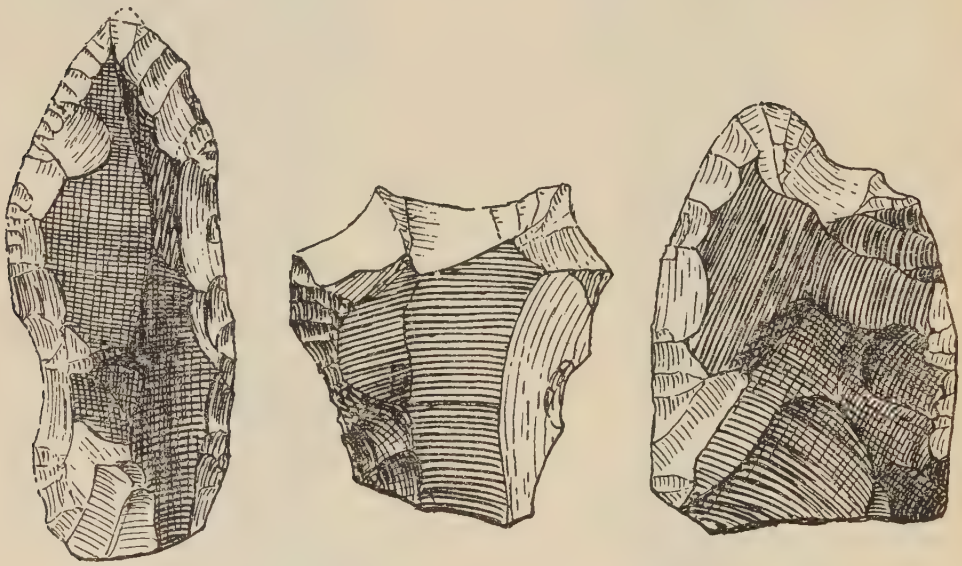


FIG. 2. LA QUINA (CHARENTE): Mousterian objects from the lower deposit with dark patina, re-worked during the period of the upper deposit (white patina). Excavations of Dr Henri Martin ($\frac{1}{1}$)

The same fact has been demonstrated at La Baumo-dei-Peyrards in Vaucluse by Deydier and Lazare, for objects also of Mousterian type. Implements from the lower deposit, with a white patina, have been found in the upper deposit, where the flint has kept its natural colour, having retouches dating from the second period.

It is true that at La Baumo-dei-Peyrards as at La Quina it is a question of the re-use of implements, after a long interval, by a people having still the same culture, retained doubtless by living tradition. We have here a parallel to that modern North American one cited above.

In the quarries of Villejuif on the outskirts of Paris I found at the base of the *ergeron* or recent löess a *biface* (hand-axe) of the Chellean or Acheulean period, marked not only by its shape but also by the deep lustrous reddish patina it had acquired from the quaternary gravels; and one of its ends had been re-chipped to a sharp point. The re-worked portion has the white patina characteristic of the deposit in which the implement was found, which corresponds with the Older Mousterian.

FIG. 3. VILLEJUIF (SEINE). Acheulean hand-axe from gravel (dark patina) re-used in the Mousterian period (white patina) ($\frac{1}{2}$)

Here is a clear instance of an object re-used in a period marked by a different culture (FIG. 3).

But now we have a much more important fact to face, in view both of the very considerable differences that exist between the culture of the borrowers and that of the model, and also of the confusion which it introduces into prehistoric studies.

One was aware of the differences of opinion which divided prehistorians on the matter of certain very peculiar specimens found in

North Africa, and which consist of arrow-heads roughly chipped on one side only. Since 1883, when Frederic Moreau remarked on the association of one-sided (*uniface*) Mousterian chipping and the neolithic tang, the problem had attracted considerable attention from students of that area. De Morgan, Capitan, Boudy, attributed the objects to the Eneolithic period. Dr Gobert saw a peculiar development of the neolithic, on the lines of a Mousterian tradition. Pallary on the other hand regarded them as typical of a decadent industry which he called the ' Berber neolithic '. Since 1919 Reygasse had published the site of Bir-el-Ater (Wad Djebbana) where, under 8 metres of alluvial deposit of apparently pre-holocene age, was a huge hearth with numerous artifacts, whose general Mousterian character was supplemented by tanged specimens. For this industry he created the term Aterian, which today is well known. Quite recently in the same district M. le Dû has found a very similar site in Wad Djouf, under equally undisturbed conditions ; the specimens are particularly fine and numerous. Further, there has been established the fact, overlooked by the earlier explorers, that there occur not only arrow-heads but also a whole group of implements—points, scrapers, bevels (*biseaux*), flakes, etc., supplied with handles (FIG. 4).

The Aterian industry, widely distributed throughout North Africa and extending right into the Sahara, is generally found on the surface or at a slight depth in brick-earths whose upper portion has been re-arranged. In the outskirts of Oran, over an area of many acres, there is a flint-site called Champ de Tir or Polygone d'Eckmuhl, where the objects are found both superficially and at a slight depth in the red clay covering the underlying limestone. This site was first published very summarily by Carrière.[2] M. Pallary has recently[3] supplied some more detailed information on this subject, and reproduced a series of tanged objects from it. He informs us that it was he who in 1885 made known to Carrière the Polygone d'Eckmuhl site. He regards it as ' berberesque '. Having in 1919 acquired the Carrière Collection, I had the first evidence obtained from Eckmuhl. Since then, under the excellent guidance of M. Pallary, I have visited the site and collected a certain number of specimens, to which M. Pallary has been good enough to add the results of some of his researches. The general character of the industry is curious and looks like a stunted example of the Aterian Industry. Its homogeneous character was obvious, because,

[2] *Bull. de la Soc. de Géogr. et d'Arch. de la prov. d'Oran*, 1886, pp. 147, 149.

[3] *Rev. Afr.* 1922, pp. 412–16.

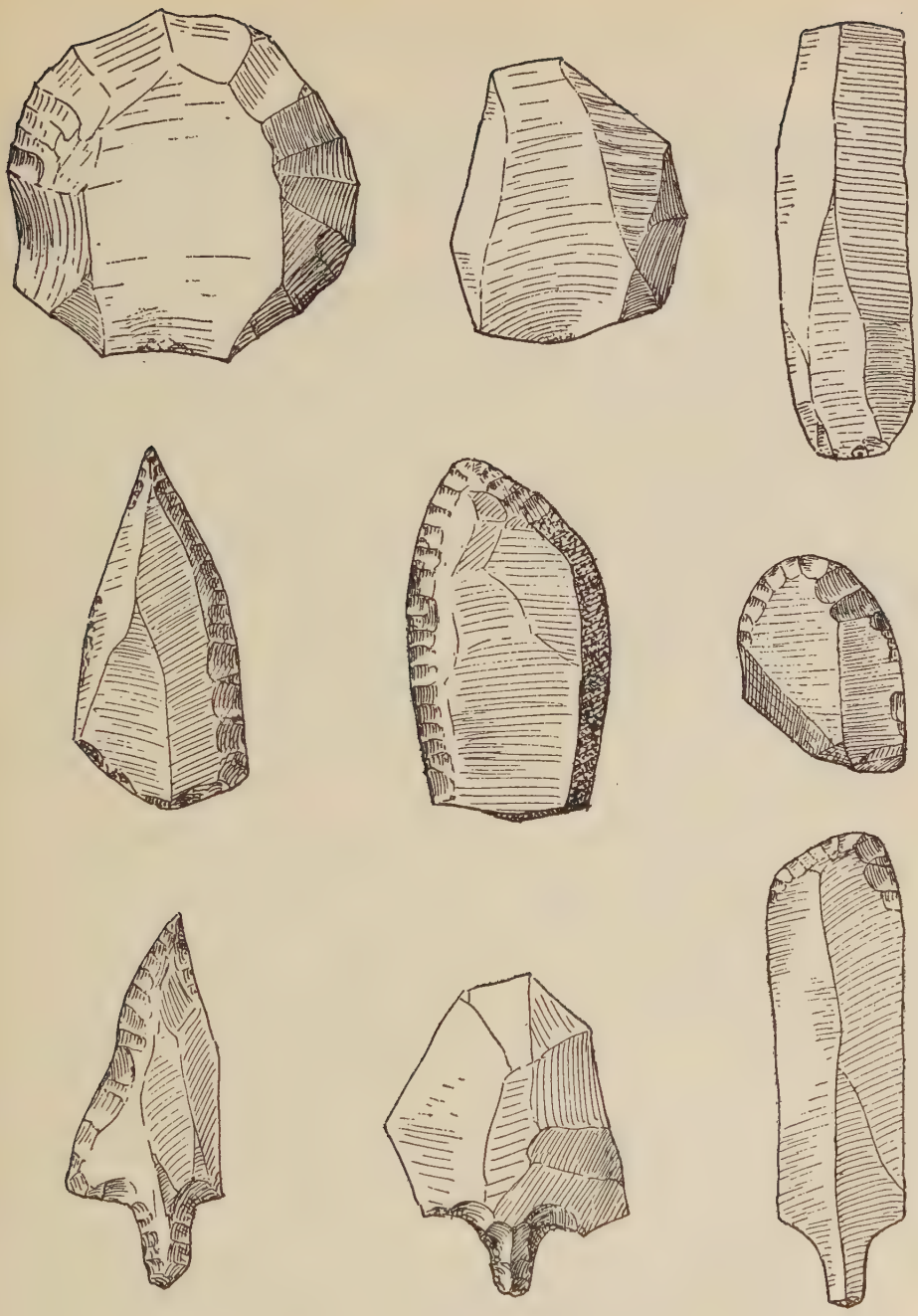


FIG. 4. BIR-EL ATER AND WAD DJOUF. Typical Aterian industry (*c.* $\frac{2}{3}$)

although merely a surface site, the number of specimens found enables accidental intrusions to be discounted. The similarities of chipping technique and patina equally demonstrate the uniformity of the whole culture. The site had no special attractions from the point of view of settlement ; it could not have been a workshop site since there was no supply of raw materials at hand ; so it was not one of those sites whose occupation is destined to last on through the ages, and where the remains of different industries are therefore found superimposed or mixed up. Thus the archaeological purity of the site is easily explained. The bulk of the industry consists of small objects which were used up completely, doubtless because of the rarity of raw material, flint and quartzite, which had to be fetched from a distance. There occur many of those discoid or round cores, finely chipped and often apparently used as implements. (These have often been explained as sling-stones). The bulk of the flakes or short blades which form the base of the industry came from these cores. Some of them have been used in their unfinished form, after a few local retouches. Others have been re-touched or re-chipped to obtain implements of the usual types : triangular points, scrapers and often tanged specimens. Without further explanations it may be said that this industry corresponds in its general principles and technique with the Aterian as exemplified in the fine deposits of the southern Constantine region. Any differences may be attributed to the raw material.

A short distance from this large Aterian site, on the edge of it one might almost say, are a series of caves inhabited at various periods.

First of all, at the bottom of a wide ravine on the coast, is the celebrated foundered cave called ' Abri Alain '. M. Pallary has conducted there a series of most careful excavations, first at his own expense, and then for Colonel Vesignié, who has a number of specimens, and for the Institute of Human Palaeontology at Paris. At the moment of writing, the archives of this foundation are publishing a monograph by M. Pallary, called ' L'Abri Alain près d'Oran, Algerie '. The industry there described and illustrated is remarkable for the small size of its implements. The cores measure 2 to 6.5 cm. in length. The majority of the worked objects consist of blades with battered backs (*à dos abattu*) in the shape of a pen-knife, or having tapering points. Also derived from the small blades are trapezes, points at the end of a blade, scrapers with side-notches. Amongst them are little round scrapers and rounded angular objects that M. Pallary regards as sling-stones. The industry belongs then, clearly, to the type which this author has called

Ibero-maurusian (whose type-site is La Mouillah) which seems to be the equivalent, in the west of the Moghreb, of the Capsian (Getulian) in the east, and of the upper palaeolithic and mesolithic in Europe. It is in any case quite certainly very different in character from the Mousterian-Aterian.

Now in the Abri Alain culture, occurring in a known group of wholly contrasted associations, are found certain tanged objects exactly like those of the Champ de Tir of Eckmuhl. One can hardly doubt in the circumstances that this type was borrowed by the inhabitants of Abri Alain from the old industry near by, which was as 'fossil' for them as for us.

The same phenomenon seems to be met with again during the following (Neolithic) period, amongst the inhabitants of the surrounding caves. In the Grotte du Polygone M. F. Doumergue has recorded[4] in the black upper layer, 'plainly neolithic' and containing microliths, blades with a tongue and with notches, bone implements and pottery (p. 48 of the separatum), the presence of patinated flints and 'of a palaeolithic facies' which he thinks derived from the Champ de Tir site (p. 30). 'This site', he says, 'may have been for them (the occupants of the cave) a kind of reserve whence they obtained a portion of their supplies' (p. 32). And the author cites also (p. 34) 'two tanged arrow-heads of the type called Berberesque (by Pallary) or Aterian (by Reygasse) . . . obtained . . . one in the Grotte des Troglodytes . . . the other . . . in the Grotte du Polygone', as well as three others of slightly different workmanship found also in the Grotte des Troglodytes. One might object that the depths of these finds were not properly noted; but the facts remain so far as the first observations are concerned.

I myself possess a tanged object with traces of re-use, labelled 'Grottes d'Eckmuhl', from the Carrière collection. It has the rather deep, slightly glossy reddish patina of the flints of the Champ de Tir; but the extremity, converted into a scraper, has been re-sharpened by some re-chipping whose fresher, more matte appearance is obvious.

Thus in these various neighbouring caves of the Polygone of Oran we see new instances of ancient stone tools re-collected by successive peoples, but with the difference that the implements thus re-used or copied have introduced a new type into the industry which took them over (FIG. 5, p. 82).

[4] *Bull. Soc. de Géogr. et d'Arch. de la prov. d'Oran*, 1927 [separatum, with separate pagination].

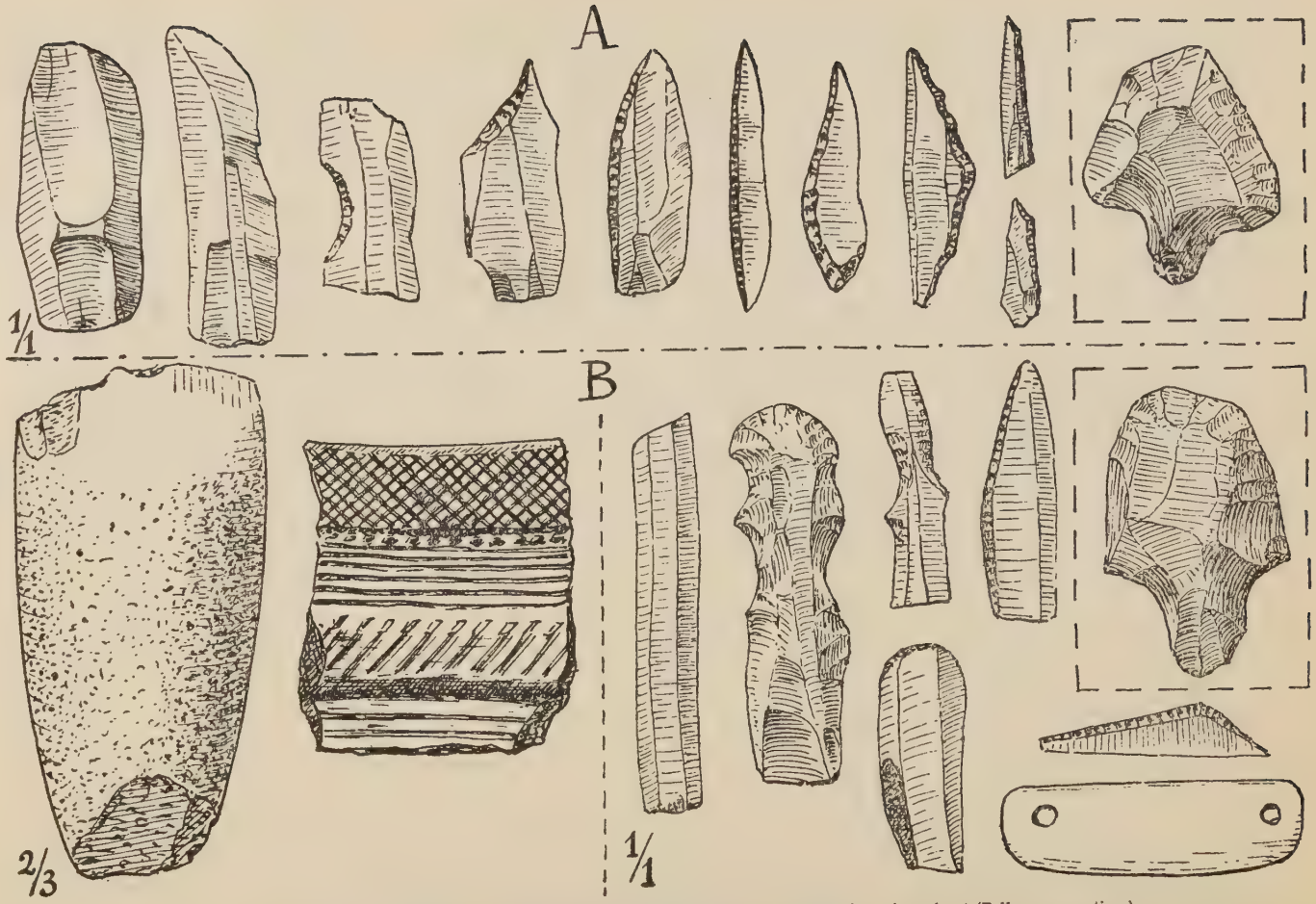


FIG. 5. *A*. ABRI ALAIN (ORAN). Typical Ibero-maurusian industry, with tanged specimen inset (Pallary excavations)
B. GROTTES D'ECKMUHL. Neolithic industry, with tanged specimen of archaic type inset (G. Carrière excavations)

This instance shows what errors one may fall into if one assumes, as one generally does, that identity of type indicates either direct connexion or the influence of contemporary industries. Apart from these common methods of tradition or transmission there may also occur the ' re-birth ' of a type through later copying by people who had no connexion with the creators of the type.

The reason why this fact has not been recognized is perhaps that metal industries contain nothing analogous. These are all of them relatively modern ; they have evolved continuously in a direction parallel with needs, and usually amongst settled peoples. Then they leave much fewer traces than stone implements, and the weapon or implement became unusable through the chemical changes brought about by contact with the soil.

But if the men of our own civilization did not copy the metal implements of their forgotten predecessors, they sometimes copied the architecture of a lost tradition. One has only to see how in our French provinces Roman monuments have inspired, at the time-distance of more than a millennium, local builders who had no traditional knowledge of what they borrowed from ancient art. And everyone knows what the great period of the Renaissance owes to the influences of the monuments then unearthed.

In the realm of prehistory, most of those with any field-experience will have observed facts bearing on the present problem. By careful study of facts like these, one may perhaps succeed in explaining the remarkable resemblances sometimes observed in the same region between industries belonging to very different epochs.

Antiquities Law, Iraq

by C. Leonard Woolley

Director of the Joint Expedition of the British Museum and of the Museum of Pennsylvania to Mesopotamia

THE Iraqi Government is proposing to supersede the Antiquities Law drawn up eleven years ago, and approved by the League of Nations, by one which will admittedly be far more onerous to the foreign excavator working in Iraq. As a prelude to the introduction of the bill before the Iraqi Parliament there has been a regular campaign of propaganda intended to show that under the existing law Iraq has been robbed, by concessions made to foreign missions, of the treasures which were legally and morally hers, and that Iraq never has had fair treatment and will not have it so long as the division of the objects from excavations is conducted by a foreign Director of Antiquities. To what lengths this campaign has been carried may be illustrated by the following: in March 1934 Abdal Rizaq Effendi, the Curator of the Baghdad Museum, personally repeated to me the statement, published in the local press, that the normal share accruing to the Baghdad Museum from the division of antiquities with a foreign mission, as conducted by the Director, was no more than one half of one per cent. of the objects catalogued. My own division had taken place a few days before; a large number of tablets and archaic seal-impressions had been reserved for division after their publication in order that the Iraqi authorities might have a better idea of the relative value of the pieces; then 75 per cent. were to go to Baghdad. There remained for division 1296 listed objects, of which the Director of Antiquities took 816 numbers, including all the best objects in each category which were selected by him before the division proper began. After the season 1932–3 the catalogue of objects comprised 516 items, of which 52 were tablets, etc., held over for division after publication, Baghdad then having the right to select 50 per cent. of the total; of the remaining 464 objects Baghdad took 302. Apart from quality, in which Iraq profited enormously by exercising the right of prior selection, the mere

number of objects in these two years amounted to 63 and 65 per cent. of the Expedition's total collection instead of the 'one half of one per cent.' quoted by the Curator of the Museum and believed by the Iraqi Ministers and the public. The proportion has never been less than 50 per cent.

As regards the charge that foreign missions have been allowed to take away objects which ought to have been kept for Baghdad, it is of course true that there are in foreign museums, resulting from the excavations which they have financed, objects which the Baghdad Museum would rightly wish to possess, and under the terms of the existing Law it would have been possible for Baghdad to have kept them. The Law is so drafted as to allow to the Director a good deal of liberty of interpretation, and successive Directors have interpreted it in the manner which they considered best for the Baghdad Museum and for the interests of science. The interpretation could have been much more adverse to the excavators—it was indeed possible to claim for Iraq virtually everything found ; had anything of the sort been done the museums would have been unable to support the excavations, work would have closed down and there would have been no Baghdad Museum. It was essential to encourage the foreign missions by conceding to them a fair proportion of objects even when the concession might be grudgingly made ; such were in the nature of an advance which the gains from future work would amply repay. Again, for many years the Iraqi Government was unable or unwilling to incur any expense whatsoever in the cause of its antiquities ; the Director of Antiquities was an unpaid volunteer (and not an expert) and the Museum consisted of a single room in the Serai wherein the objects were laid out on open tables ; even when a special building was allotted to the Museum there was no technical staff employed. During those years the Director of Antiquities when conducting a division had to bear in mind the capacities, or the incapacities, of his Department ; the Baghdad Museum could not deal with objects whose preservation or restoration involved technical knowledge and an expenditure beyond his budget : in some cases he saw himself scientifically bound to let go what he knew to be an important museum piece, but in every such case the balance was so far as possible redressed by setting against it a number of objects in good condition whose value might be not less than that of what was surrendered. The Joint Expedition was on these grounds allowed to keep the mosaic standard and the two goat statues, which the Baghdad Museum of those days could not have handled, while

the great gold harp was restored for Baghdad at the Expedition's cost. For the same reason we had obtained the battered fragments of the Ur-Nammu stela ; but these are the only important objects whose fate was decided by considerations of the treatment which they would receive. From the time that the Government acknowledged its responsibilities and provided the Museum with a technical staff the Director has not been hampered in his selection by the question of preserving objects from destruction, and the Baghdad Museum has benefited accordingly.

There was no year in which I would not gladly have exchanged the Iraqi share of objects for that allotted to the Expedition, not even excepting the years 1927–8 and 1928–9, for at the time I did not know whether the standard and the goat statues could be restored or what merit they would have should restoration prove possible. In 1922–3 Baghdad took the diorite statue of Entemena (the best statue we have ever found), the gold figure of a priestess, half the jewellery and other objects. In 1923–4 Baghdad took the mosaic milking-scene, the finest object from al'Ubaid, as well as representative pieces of the other friezes (in each case, I think, the best piece) and the gold *bulla* inscribed with the name of A-anni-padda ; the Expedition had the foundation tablet, two copper bull statues whose restoration was problematical, and duplicates of the other Baghdad pieces. In 1924-5 the Ur-Nammu stela fragments fell to the Expedition ; Baghdad took a Kassite boundary stone and a Third Dynasty limestone relief which were otherwise the best objects. In 1925–6 our best objects were the diorite statue of Bau and a torso of Dungi, two limestone ram figures, a limestone plaque and an alabaster plaque, two fragmentary and one complete stone heads, and the stela of Bur-Sin—the last not beautiful but of historic interest. Baghdad took the Bau statue and the Dungi torso, one ram figure, the complete stone head and the Bur-Sin stela. In 1926–7 there were no very outstanding objects and the division was fairly equal. In 1927–8 (the first year of work on the Royal Cemetery) everything else was overshadowed by the gold dagger and *étui*, both of which went to Baghdad. In 1927–8 there was a vast mass of treasure to be divided ; this was done for the most part in such a way as to keep tomb-groups intact : Baghdad kept the tomb-group of Mes-kalam-dug with its gold helmet, etc., the Expedition retained that of Shub-ad ; as the latter contained many more objects a number of other groups (such as that of ' the baby princess ') was added to the Mes-kalam-dug group in order to give to Baghdad the superior share ; with them went the

silver model of a boat and the embossed silver cup, the only example of silver repoussé work found ; the standard was allotted to the Expedition.

In 1928–9 the Expedition profited by the Museum's lack of staff, as I have explained, in securing the two goat statues ; Baghdad had the fine tomb-group with the unique gold cylinder-seal and gold tumbler, and the horned human head in bronze, also a unique piece. Since that date (when Mr Sidney Smith took in hand the organization of the Museum) the division has been much less favourable to the Expedition for the simple reason that Baghdad could now deal with its accessions ; the best objects have in every case been taken and nothing has been set against them as compensation to the excavators : thus in 1929–30 the fine steatite boar of Jemdet Nasr date and the two best al'Ubaid figurines were taken ; in 1930–31, out of the main finds—three lime-stone statues, two terra-cotta reliefs, a fragment of a third terra-cotta and a ram's head in diorite—Baghdad selected the ram's head, one relief and two statues ; in 1931–2 the outstanding objects were the magnificent steatite bowl carved in relief with a procession of oxen, a granite relief of Ur-Nina and four inscribed copper cylinders ; Baghdad took two cylinders, the relief and the bowl and on the subsequent division secured 323 of the 588 items catalogued, having the right of first choice in each category. It is not too much to say that as inter-preted recently the Antiquities Law so far from being too lax has proved so severe that the wisdom, indeed the possibility, of carrying on excavations has been doubtful. The threat of the new law and the forecast of its terms has resulted in this, that whereas two years ago there were eleven Expeditions in Iraq this winter sees them reduced to three. The policy which produces that effect is obviously short-sighted ; it has seemed well to explain how groundless is the agitation which has led to it.

An abbreviated edition of the preceding article was published as a letter in *The Times* and has been met by an article in the Baghdad newspaper *el Bilad*. The writer accuses me of ignorance of facts in that I ' asserted that the Director of this Museum receives no salary ': this is untrue. I stated that ' for many years . . . the Director of Antiquities was an unpaid volunteer ', which *el Bilad* admits to be true, and I referred to the change that took place when the Iraq Government acknowledged its responsibilities and provided the Museum with a technical staff.

The newspaper quotes at length the Director of Antiquities' account of the passing of the original Law of Antiquities. With that I had not concerned myself : my point was that the existing law as dealing with foreign expeditions fully safeguarded the interests of Iraq, so that in those respects no change was desirable.

The Director of Antiquities is represented as saying that, with regard to the distribution of objects (between the Iraq Museum and foreign missions) he had made a study of the facts but had been unable to obtain precise figures offhand. I cannot understand his inability, as lists are filed in the Museum of each season's finds made by each Expedition, and on those lists the allotment of each individual object is noted. The figures quoted in my own article are taken from the duplicate lists in the possession of the Ur Expedition.

The Director of Antiquities added ' Don't be surprised when I tell you that the number of objects lent to the mission excavating at Ur alone exceeds five thousand '. These are tablets and inscribed objects not yet definitely allotted, the publication of which has been entrusted to the Expedition, and, as I stated, and the Director agrees with me, distribution of them will be made after publication : then Iraq will select, according to signed agreements, in some cases 50 per cent. and in some cases 75 per cent. of the totals.

Not a single statement made in my letter has been met or refuted by the *el Bilad* rejoinder. I should only add that my judgment of the new Antiquities Law was based on a summary sent out by the Antiquities Department itself to excavators, and the existence of such a draft is ignored and even implicitly denied in the Arabic article. Lastly I said that the expeditions working in Iraq would be reduced this year ' to three or even to two ' ; *el Bilad* says that work is going on in four regions—this is correct, but two of the sites mentioned are worked by one Expedition—that of the Oriental Institute of Chicago—and only three Expeditions are in the field.

Notes and News

SUPERIMPOSED CULTIVATION-SYSTEMS (PLATE I)

When I first described the Celtic field-systems so admirably revealed by air-photography, I mentioned one instance where it seemed that that system was overlaid uncomformably by another.* There was not then time to examine the site—which is remote and difficult of access—nor was the only air-photograph then available good enough for detailed study. Since then others have come to hand, and I have walked over the ground, marking in on the photograph (PLATE I) certain features which it does not show. The result confirms my hypothesis ; but the absolute age of each system remains unproven.

The area is on Thornham Down, and includes the southwestern-most portions of the parishes of Rushall, Upavon and Enford (Wilts, 47 NW). Archaeologists will recognize its position when I say that it is 1½ miles southwest of Casterley. As it falls within the danger-zone of the artillery ranges, it can only be visited on certain days ; and as there are no made roads within two miles, one has to walk there. In spite of the intermittent bombardment the region has undergone for so many years, the permanent damage done is surprisingly small; indeed more harm has been done by the burrowing of rabbits which here, as everywhere on War Department land, have bred and multiplied inordinately.

The older system consists of a series of ' ladders ' standing, so to speak, upon Old Ditch. The component parts were small rectangular fields of a common type, with some very pronounced lynchets. The biggest of these still stand out very clearly, throwing a strong shadow. They have survived even where the long swathe-like ridges of the later system have obliterated the others, leaving but a faint undulation visible. In places one can perceive the ribs of this older system showing up through the other like the bony skeleton of an old horse. At certain points (marked A in the explanatory diagram), the intersection of the two is very plain, both on the photograph and on the ground ; on the

* *Air Survey and Archaeology*, 1st edn., 1924, plate V, p. 22.

ground the later age of the ' swathes ' is very plainly seen, for they cut right into the older lynchets.

There can be little doubt that the later ' swathe ' system is of Saxon or Medieval date. The strip-like character of the cultivation alone would suggest this ; but even stronger evidence is to be found in the fact that genuine strip-lynchets occur on the slopes of Water Dean Bottom, extending almost continuously as far as the mouth of the Dean at Compton. It is difficult to dissociate these from the cultivation-system here shown, which seems to be an extension of the Compton group. If they are Saxon or Medieval then this photograph is an example of what has long been desired, namely, of the strip-system superimposed upon an earlier Celtic one. Evidence of early Saxon occupation has been found at West Chisenbury in the Avon Valley, only $2\frac{3}{4}$ miles to the northeast of Thornham Down. Here, finds indicating a pagan Saxon cemetery were found in July 1928 (*Wilts. Arch. Mag.* XLV, 84). Such finds are notoriously rare in Wiltshire. Waterdean Bottom (called Waterdeane in 1591) is one of the deepest combes of the Plain, with perennial flowing water in its lower portion. It would therefore have attracted settlers in all periods, particularly the Saxons.

The cultivation-terraces at Compton have already been illustrated (*Air Survey and Archaeology*, 2nd edn., 1928, plate VI B).

It will be observed that although the later cultivators have occasionally run their ploughs diagonally across the older rectangular Celtic field-system, elsewhere they have respected its lines. That was to be expected ; and no doubt it happened in every region where the one system impinged upon the other. It certainly happened, for instance, along the slopes of the lower Avon Valley (see Ordnance Survey ' Map of Celtic Earthworks of Salisbury Plain ', scale 1 : 25,000, Old Sarum sheet, published 1934) ; and probably throughout the chalk-region of Kent. Commonsense would ordain that the bigger, steeper lynchets should be adopted as the boundaries of the later fields ; whereas the smaller ones could be ploughed over and ultimately levelled.

It will be noticed that the Celtic system is aligned upon Old Ditch, a linear earthwork consisting, where best preserved, of a low bank between two ditches.

Another instance of strip-ploughing upon an older rectangular Celtic system occurs on Great Litchfield Down, near Ladle Hill, North Hants. (Ordnance Survey air-photograph ' Ladle Hill 2144 ').

O.G.S.C.

PLATE I

AIR-PHOTOGRAPH OF THORNHAM DOWN, WILTS, SHOWING TWO SYSTEMS OF CULTIVATION SUPERIMPOSED. (*See* p. 89)

facing p. 9

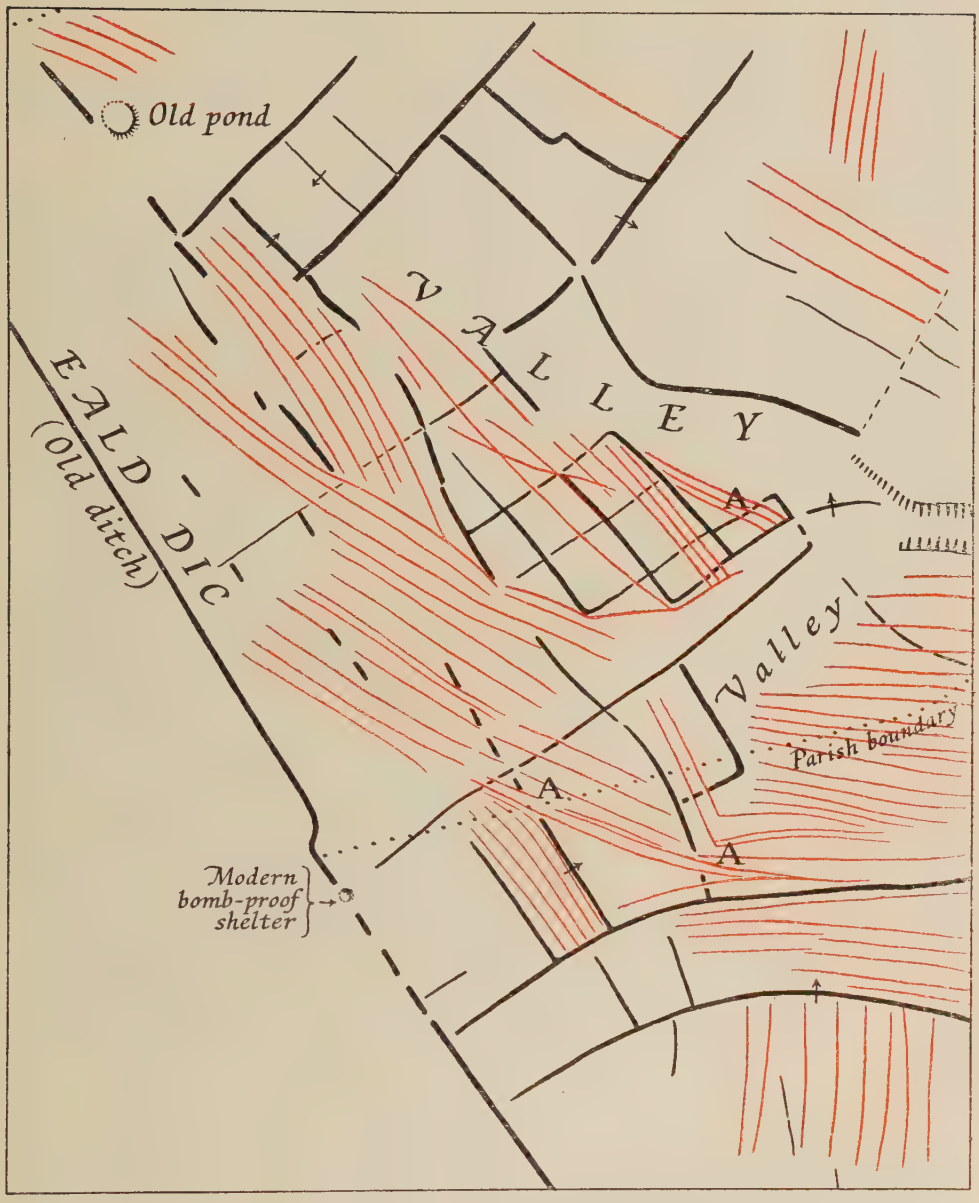


DIAGRAM TO EXPLAIN AIR-PHOTOGRAPH

The black lines are the boundaries of the outer (Celtic) field-systems; the red lines the ridges of the later (Saxon or medieval) strip-system. Arrows indicate direction of slope.

RECENT WORK ON HADRIAN'S WALL (PLATE II)

The following summary of last season's work on the Roman Wall has been received from Mr F. G. SIMPSON, Director of the Cumberland Excavation Committee, and Mr IAN A. RICHMOND :—

The investigation of Hadrian's Wall, whose eighty Roman miles bristle with major and minor problems, receives little attention in ANTIQUITY, largely because the results of the steady work devoted to this greatest of Roman frontiers year by year is to be measured rather by quinquennial than annual reckoning. Five years ago, excavations at Birdoswald (summary in ANTIQUITY, 1930, IV, 102–4), marked the culmination of the efforts directed to defining the main periods of the Wall's history. Since then, efforts have been directed for the Cumberland Excavation Committee in the west by Mr F. G. Simpson, assisted by Mr I. A. Richmond and others, towards solving the relation of the Stone Wall to the Turf Wall and the Vallum. The latter question still awaits final solution, though steady progress has been made towards that goal. The place of the Turf Wall in relation to the Stone Wall may be regarded as settled conclusively by the recent excavations at High House Turf-Wall milecastle, the fiftieth milecastle from the east, which is situated in the only sector where the Turf Wall is not overlaid by the later Stone Wall.

The new milecastle resembled those of stone in pattern, but had ramparts of turf and gates of timber. A single internal barrack was of wood, and yielded evidence for a short occupation only. The front gate of the milecastle had supported a tower, overlooking a causeway across the ditch—a causeway of virgin soil, pierced by a wood-lined gulley to prevent a wash-out in the ditch on the steep slope. This and all other woodwork was dismantled at the close of the occupation, as shown by chips of sawn timber found in the two rubbish pits of the demolition-squad. These pits were dug through the occupation-earth of the milecastle, and one of them contained a fragment of the dedicatory-inscription of Hadrian and Platorius Nepos, carved on a two-inch oak board, once placed above the milecastle's north gate (PLATE II). The restoration of this inscription, from portions of six letters, is due to Mr R. G. Collingwood, and represents one of the most exciting contributions of the skilled epigraphist to mural research. The result is to date the Turf Wall to the governorship of Platorius Nepos in A.D. 122–126, and to class it as part of the same scheme as the Stone Wall,

already being built further east. The combined scheme, partly in turf and partly in stone, is the result of Hadrian's own visit to the province.

Meanwhile, the length of the Turf Wall has been determined by following up the discovery, in 1927–8, that this wall had a special type of stone turret, easily distinguishable from turrets belonging to the Stone Wall by its special architectural features. These turrets, later embodied in the Stone Wall, have been traced from Birdoswald far into Cumberland, and the end of the trail was reached in 1934, when turret 79A, the last on the wall, proved to be of Turf-Wall type. While the west limit of the Turf Wall is thus known, the east limit is marked by the cessation of the Turf-Wall type of turret at the Irthing, east of which the turrets at once conform to Stone-Wall type. Hadrian's Wall emerges as a composite work, of which 49 miles were built in stone, and 31 in turf : and the reason for the employment of turf in the west is to be connected with the entire absence in those regions of local supplies of lime, used in great quantity for grouting the masonry structure.

While the discoveries at High House milecastle show that the Turf Wall was rapidly replaced by the Stone Wall in this sector, it remains uncertain whether this was true throughout. Turret 54A produced, in 1933, evidence for a reconstruction of the Turf Wall after an already considerable occupation, while showing at the same time that the Stone Wall was built before the disaster of A.D. 196. Again, evidence exists to show that the 'Turf' Wall was in this very sector built largely of beaten clay. These facts, while not affecting the original date of the Wall, suggest that further digging will produce and solve interesting minor problems. Detailed annual reports of this work have been regularly published in the *Transactions of the Cumberland and Westmorland Archaeological and Antiquarian Society*, which has long been responsible for western investigations on the wall ; and an extended summary of the evidence relating to the Turf Wall is to appear in a forthcoming volume of the *Journal of Roman Studies*.

ROCK-MARKINGS IN SOUTH AUSTRALIA (PLATES III, IV)

Mr A. L. Meston's illustrated article (ANTIQUITY, 1934, VIII, 179–84) on rock-carvings in Tasmania is of much interest to workers in South Australia, where since 1902 many markings of similar type have been recorded. Some account of these will be found in the papers, in

which additional references are given, mentioned in the footnote.[1] In these papers rock-carvings of several types and of varying ages are described ; their detailed classification has not yet been attempted. Those of special interest are chiefly found carved on outcrops of slate and quartzite rocks in the arid and semi-arid regions of the Flinders Range, Yunta and Mootwingee districts ; although we also noted similar carved circles, etc. during the Adelaide University Anthropological Expedition to Macdonald Downs at Undala, Central Australia.[2]

Mountford's summary (*l. c.*, 1928) of them is an excellent one. The designs include circles, lines, animal tracks and outlines of animals.

There has always been a tendency amongst South Australian recorders to regard this type of carving as surviving from ' antiquity' or ' great antiquity '. The evidence deduced has been for the most part quite general. It may be accepted tentatively as an ' opinion '. None of the surviving Australian tribes has claimed ownership of them and no suggestions of carvings made in modern times have been noted except a statement by a civilized native at Owieandana, who vaguely attributed some marks to his 'grandfather'. (Hale and Tindale, *l. c.*, 1925, p. 55).

The accompanying photograph (PLATE III) shows a typical series of South Australian rock-markings of a type similar to those recorded from Tasmania by Mr Meston. The resemblance is particularly close to those records from Mount Cameron West, a locality ascribed in error on the plates to New Zealand.[3] This photograph was taken at Middle Waters, Wilpena, South Australia ; the outlines having been filled in with white clay to make them more apparent. PLATE IV shows a more elaborate drawing from Warrawarumby Creek, three miles north of Panaramittee Station in the Yunta district of South Australia. Associated with circles and other figures there is the outline of the head of a crocodile, a type of animal now extinct in South Australia, although its remains are found in Pleistocene and perhaps in early Recent beds.[4]

[1] Basedow, *Journ. Roy. Anthrop. Inst.*, 1914, XLIV, 195–211, pls. I–XVII ; Hale and Tindale, *Records S. Aust. Museum*, 1925, III, 52–56 ; and 1930, IV, 208–11 ; Campbell, *Trans. Roy. Soc. S. Aust.*, 1925, XLIX, 123–7, pls. XI–XII ; Pulleine, *Trans. Roy. Soc. S. Aust.*, 1926, L, 180–2, pls. XXV–XXVIII ; Mountford, *Rept. Aust. Assoc. Adv. Sci.*, Hobart, 1928, XIX, 337–66 (bibliog.) ; Hale and Tindale, *S. Aust. Naturalist*, 1929, X, 30–34.

[2] Tindale, *Trans. Roy. Soc. S. Australia*, 1931, LV, 37.

[3] This unfortunate slip has been duly noted in our corrigenda to volume VIII.—EDITOR.

[4] There is a plaster cast of this carving in the South Australian Museum, and copies of it and many others are available for exchange.

The carvings at Mount Cameron West appear to possess so many affinities with the markings of similar type from South Australia that they must be regarded as another link in the growing chain of material evidence suggesting that a Tasmanoid people once lived on the Australian continent, as well as on its Tasmanian peninsula. Implements of Tasmanian facies have been found in more than one place in New South Wales and South Australia. Upon the arrival of the newcomers, the Australoids, these autocthones died out save in the refuge area provided by the cutting off of Tasmania as an island, a result of post-glacial changes in sea level. The actual process of replacement of Tasmanoid by Australoid may well have been similar to that large-scale operation today whereby the Australian aborigines themselves are vanishing before contact with Europeans, leaving minor traces in the language of the newcomers and a few people of mixed blood who tend to merge into the mass of the European population.

NORMAN B. TINDALE.

RAG-WELLS (PLATE V)

In the introduction to his book *Legendary Lore of the Holy Wells of England*, published in 1893, Mr R. C. Hope writes :—' The hanging of rags and scraps of clothing on the branches of trees, and on bushes about the Holy Wells, is probably a remnant of the old tree-worship ; it obtains all over the globe ; it is very common in Great Britain '. The photograph (PLATE V) taken during the summer of 1934 shows a ' Rag well ' known as St Helen's well in the parish of Walton, West Riding of Yorkshire (Yorks, 189 NE). This well is given twice in Hope's book under Newton Kyme and Thorpe Arch, two neighbouring parishes ; but despite the statement quoted that rag-wells are very common in Great Britain only four others, Gargrave (Yorks), Newcastle and Benton (Northumberland), and Great Cotes (Lincoln) are given in his catalogue of 450 holy wells. The custom of hanging rags on the bushes was already extinct at the first three of these when Hope wrote. It therefore seems likely that a functioning rag-well may be sufficiently rare to merit illustration and description in ANTIQUITY.

St. Helen's well is situated in a little copse called Chapel Wood on the east side of the Roman road known as the Rudgate, which runs north and south and crosses the river Wharfe at St. Helen's ford. The well is 190 yards north of the north bank of the river. There is now no well or visible spring, but from the position at the lower margin of a gravel terrace it is obvious that water would be obtainable by digging

a few feet ; a small stream flows just east of the site. The Roman road is well authenticated ; in later times a chapel, dedicated according to Leland to St. Helen, stood in Chapel Wood between the track of the road, here a grassy lane, and the well. Fragments of an early sculptured cross were found here; an illustration of these fragments from Whitaker is reproduced by Bogg in his *Lower Wharfedale*, where there is also a photograph and description of the well in 1900.

It is curious that the hanging of rags should survive when the actual well has vanished, but the writer has visited the spot many times in the last seven years and there are always plenty of obviously recent additions. The custom is to stand facing the well (*i.e.* due west) preferably after sunset, wish, and then attach something torn from one's clothing either to the big tree—a wychelm—or to any of the bushes. Probably the custom is largely maintained by vagrants who frequently camp in the wood, but it also has its attraction for courting couples from the neighbouring villages !

The writer has been informed by Mr C. Shillito, agent of the Brocklesby Estate, that the ' Healing Well ' near Great Coates (spelt Cotes by Hope) is now in a neglected state, but that 30 to 40 rags are hanging on the bushes. He has also enquired of his colleagues on the Geological Survey, but not many instances of rag-wells are known to them. Mr Dewey mentions one in Beddington Park, Surrey, as still functioning, and quoted St. Mary's well, Boxwell from *Ancient Wells, Springs, and Holy Wells of Gloucestershire* (1928), by R. C. S. Walters. But in September 1934 this well was utterly deserted though an aged labourer on the estate ' had heard tell ' that visitors used once to hang rags there.

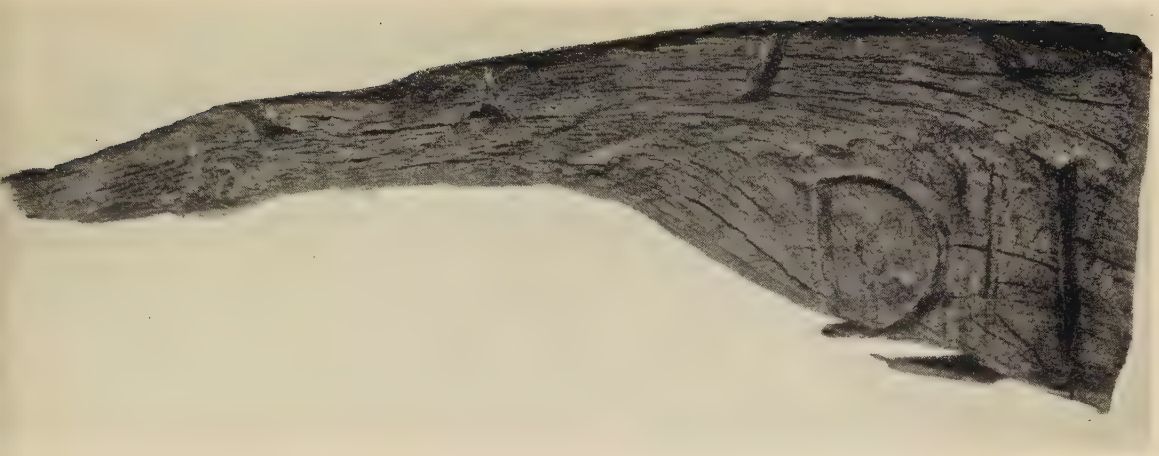
The photograph is by Mr J. V. Stephens of the Geological Survey, York.

C. N. Bromehead

THE *HOGA* OF CUTTESLOWE

On the roll of the justices in eyre who sat at Oxford in the year 1261 (Public Record Office, Assize Roll 701, m. 22) is an entry of some archaeological interest :—

> Duo homines extranei inventi fuerunt occisi sub hoga de Cudeslowe. . . Et testatum est per xii quod malefactores latitant in concavitate illius hoge, et ibi plures roberie et homicidia fuerunt. Ideo preceptum est vicecomiti quod prosterni faciat hogam illam.
>
> Translation. Two strangers were found killed under the ' how ' of Cutteslowe. The hundred jury testify that evil doers



IMP·CAES·TRAIANI
HADRIANI·AVGVSTI
LEG·II·AVG·A·PLATORIO·NEPOTE
LEG·AVG·PR·PR

INSCRIBED TIMBER FROM TURF-WALL MILECASTLE AT HIGH HOUSE, WITH RESTORATION BY MR R. G. COLLINGWOOD. (*See* p. 92)

PLATE III

ROCK-MARKINGS AT MIDDLE WATERS, WILPENA, SOUTH AUSTRALIA. (*See* p. 94)
Ph. S. F. Ackland

ROCK-MARKINGS AT WARRAWARUMBY CREEK, NEAR PANARAMITTEE STATION, YUNTA DISTRICT, SOUTH AUSTRALIA. (*See* p. 94)
Ph. S. F. Ackland

PLATE V

RAG WELL, KNOWN AS ST. HELEN'S AT WALTON, NEAR WAKEFIELD, YORKS. (*See* p. 93)

Ph. J. V. Stephens

are wont to lurk in the hollow of the ' how ', and that many robberies and homicides have been committed there. Therefore the sheriff was commanded to level the ' how '.

Cutteslowe, today a part of Wolvercote, but formerly a parish of itself, in Wotton Hundred, lies immediately to the north of Oxford, between the Cherwell and the main road running from Oxford to Banbury. In Domesday Book five hides are attributed to Codeslau, two held by the canons of St. Frideswide, and three by Roger of Ivry [*Dd.* 1, 157, 159]. A St. Frideswide's charter, attributed to 1004, includes the *portstret*, that is, the Banbury road of today, in the boundaries of its holding at Cudeslowe [*Cartulary of St. Frideswide*, ed. S. R. Wigram, 1, 4] ; and the Rev. H. E. Salter kindly pointed out to me that if the *hoga* was near the high road, it would be very handy as a hiding-place from which to attack wayfarers. Of the two Cutteslowe farms today, the northernmost, St. Frideswide's, the property of Christchurch, immediately adjoins the Banbury road, and presumably represents the canons' Domesday holding. There is a very fine old farmhouse, with a moat, but the farmer, Mr A. B. Kerwood, informed me that so far as he knew, no ancient remains had been found on his land and, as is perhaps only to be expected after 670 years, there are no obvious signs of any mound or rising in what is, on the whole, a very flat stretch of land. There seems no doubt, however, that the mound which the sheriff was ordered to level in 1261 was the barrow or *hlaw* which originally gave its name to Cutteslowe. HELEN M. CAM.

Miss Cam's discovery raises a whole number of other points, some of more than merely local interest. It may be said at once that the exact site of the ' hoga ' cannot now be identified, but that it may well have been very near to, if not actually on, the site of the present farm, the northernmost of the two. (This, as Miss Cam has said, is the older ; it was called ' Old Cutchlow ' on the Ordnance Map of 1814). Now there are actually two *round* barrows about 400 yards west by north of ' Old Cutchlow ' ; though much ploughed over they are still plainly visible both on the ground and on an air-photograph. There is another a little further west, near spot-height 250 (Oxon. 33 NW, edn. of 1922).[1] The two round barrows first mentioned may well be the

[1] I have no doubt that there were many more along this gravel ridge between Thames and Cherwell. Major Allen found and photographed two barrow-circles on the Keble College cricket-ground last summer ; and there is a round mound which may be a barrow on Port Meadow.

' twam lytlan beorgan ' of the bounds of Eatun (BCS. II, no. 607, A.D. 900 for 904), if, as I believe, that place is to be identified with Water Eaton rather than with Wood Eaton. (I cannot discuss this now, but would point out that the mention of Wifeles Lace both in these bounds and in those of Cutslow of A.D. 1004 proves that the two townships adjoined one another). In any case there is thus both documentary and field evidence of barrows at Cutslow, though so far only of round ones ; and for a robbers' den we require a stone-chambered long one ! We need not go far to find an example, nearly ploughed out but authentic—the ' langan hlæw ' of A.D. 1005 described in ANTIQUITY 1930, IV, 357. This long barrow lies exactly 5 miles northwest of Cutslow, by the side of the same ridgeway (the ' portstret '). From the stoney nature of what survives it is reasonable to suppose that it was originally a stone-chambered structure like the Cotswold ones. Further, Mr A. H. A. Hogg has found what he believes to be yet another long barrow $\frac{1}{4}$ of a mile to the southeast of it.

It seems therefore that there may have been as many as three stone-chambered barrows on the lowland ridge running parallel to the Cherwell on the west. That would be in complete accordance with what we now know about the topographical fancies of prehistoric man—his love of gravel and limestone and his dislike of heavy clay soils.

For the moment, however, what is required is some old estate-maps of the parishes of Water Eaton, Wood Eaton, Cutteslowe (as it is spelt on the O.S. map) and Gosford, so that the bound-marks already quoted may be identified with certainty.[2] O.G.S.C.

[2] I should like to thank Mrs Cunnington who first called my attention to the subject here discussed.—O.G.S.C.

Recent Events

The Editor is not always able to verify information taken from the daily press and other sources and cannot therefore assume responsibility for it.

A battle in A.D. 821 is, perhaps, hardly a ' recent event ', but it seems at any rate to be ' news ', since the last record of it (so far as known) was in Leland's *Itinerary* (ed. L. Toulmin Smith, 1908, II, 151–2). The passage runs as follows :—

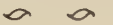
' A°. D^{i}. 821. fuit grave bellum inter Egbertum regem West-Sax. et Ceolwlphum regem Merciorum inter Abingdon et Oxford in loco qui Cherrenhul dicitur, victore Egberto '.

No other record of this battle has survived. Leland derived his information ' ex libro Universitatis Oxon.', so that there is good hope that the source from which he took it may still survive, either in the Bodleian or in some college library or muniment room. The name, which should appear now in some such form as Charnhill, is not known to those most familiar with the history of the region. On the other hand, as Dr Salter has pointed out (in a letter), Leland does not make it clear whether he himself knew the place to be between Abingdon and Oxford, or merely that his authority said so.

Another interesting fact recorded by Leland (edn. 1907, I, 50), is that Hull was paved with stones imported as ballast from Iceland :— 'At such tyme as al the trade of stokfisch for England cam from Isleland to Kingeston, bycause the burden of stokfisch was light, the shipes were balissed with great coble stone brought out of Isleland, the which yn continuance pavid al the toun of Kingeston throughout'.

Iceland is mainly formed of volcanic rock, and the cobbles, if any still survive, should be easy to identify. The point is of interest to

geologists, and shows that 'foreign' stones, even of large size, may occasionally be transported by human agency. Geologists, of course, have always been fully aware of this; we cite this instance merely because it is not often that such circumstantial details are set on record.



What seems to be the remains of an early system of field-walls has been revealed by air-photographs at Cush, near Kilfinane, co. Limerick, where Mr Seán O'Riordain has been excavating. (*Irish Press*, 19 November 1934).

In a lecture at Belfast Dr Mahr, Director of the National Museum of Ireland, suggested that the custom of living in pile-dwellings above water (though sometimes also on dry land) originated in Central Europe and spread outwards to the marginal regions; and that in these it lingered on long after it was abandoned in the lands of its origin. The theory is an attractive one and seems in agreement with most of the known facts; but it appears from the discoveries at Ehenside Tarn in Cumberland that pile-dwellings were already known in Britain in the Neolithic period. (Report in the *Belfast News-Letter*, 6 December 1934; see also *Arch.* XLIV, 273 and *Arch. Journ.* 1931, LXXXVIII, 143).

The earthworks at Stanwick in Northamptonshire have again come under discussion. In an unguarded moment the writer of these notes once suggested, without having seen them, that they might be no more than the remains of a medieval deer-park. He takes this opportunity of withdrawing that opinion. After flying over them for some time and consulting air-photographs taken subsequently, he has no doubt that they are of prehistoric origin, comparable to those near Verulamium. This interpretation is supported by the well-known bronze objects from there, now in the British Museum. (*Northern Despatch*, 24 October 1934).

An Expedition is at work excavating 'a settlement of the early Byzantine Age in Nubia'. (*Morning Post*, 18 October 1934). We hope that some day that site of first-class importance, the town of

Soba on the Blue Nile, some 12 miles above Khartum, will be dealt with by a fully qualified archaeological expedition. It is a plum, and is, we understand, practically untouched. The only other excavations, conducted in that region more than 20 years ago, are still unpublished ; but they revealed the existence of an otherwise unknown contemporary culture of some pretensions.

Excavations at the hill of Mapungubwe, conducted by Pretoria University, have resulted in the discovery of many gold objects. (*African World*, 13 October 1934).

Every lecturer knows, and fears, the local press-reporter who asks for a summary of the lecture (so that he may not be obliged to remain and compile one himself). Those who refuse do so at their own risk. Amongst them was, presumably, the lecturer on the Evolution of Roman Architecture who was reported (13 October 1934) as saying that ' the Etruscans had developed a splendid civilization in Italy by 8000 B.C.'. One might attribute the extra cipher to a printer's error, had not the column been headed ' Modernism 10,000 years ago ' !

A Swedish Expedition led by Dr Olaf Janse is to excavate ancient cemeteries of the Hun Dynasty in Yunnan. (*Birmingham Daily Mail*, 29 October 1934).

A new room has recently been opened in the Baghdad Museum, devoted mainly to the objects excavated at Warka (Erech) by the German Expedition. (*Morning Post*, 12 December 1934).

St. Sophia has now been closed as a mosque, after having been used as such ever since the Ottoman conquest in 1453, and is now to become a museum of Byzantine Art. (*The Times*, 11 December 1934).

The outstanding success of the Fenland Research Committee since its inception in 1932 has indicated the need for similar coordinating organizations elsewhere. The latest recruit is Norfolk, where a Research Committee was inaugurated at the end of September. It consists of slightly over fifty individuals of whom one-third are resident outside the county. The Norfolk Research Committee has adopted the same wide terms of reference as its prototype. The field of investigation comprises the whole county except the Fens in the west, which belong to a different natural region. The county boundaries will not be adhered to rigidly. On the archaeological side the committee hopes to excavate some of the sites already revealed by air-photography. The work of Sir Cyril Fox on the distribution of man in East Anglia has shown the significance of the area, and has outlined its problems. The committee will devote itself to a solution of these and kindred problems in geology, geography, plant ecology, social and economic history, palaeontology and climatology. No separate publications will be issued ; the results will be published by individuals or groups of individuals in the appropriate journal. The cooperation of all interested in the problems of this area of East Anglia is invited. Communication should be made to the Hon. Secretary, Mr Rainbird Clarke, c/o The Castle Museum, Norwich. Financial assistance is needed urgently and contributions to the funds will be gratefully received by the Hon. Treasurer, Mr C. R. A. Hammond, Barclays Bank, Norwich.

At Doring in the ' region of the Tibetan lakes ' there have been found alignments of standing stones ' comparable in every respect with those of the Morbihan, except in the larger number of the parallel rows which are eighteen. As in the Morbihan, they appear to end (in the west) at a stone circle, enclosing several standing stones in front of which is a stone table '. (*L'Anthropologie*, 1934, XLIV, 627 reviewing ' *Sur les pistes de l'Asie centrale* ', par G. de Roerich : Geuthner, 1933).

A geographical study of ' " hommes supérieurs " du Portugal (les militaires et les hommes politiques étant systématiquement exclus) ' reveals the fact that they are closely associated with intellectual centres. Racial and environmental factors seem to have little or no connexion.

(*L'Anthr.* 1934, XLIV, 634, reviewing A. A. Mendes Correa, 'La distribution géographique des Hommes supérieurs'. *Rev. Anthr.* 1933, XLIII, separate pagination).

Mousieur Favret has been given a grant to excavate the grottes of the Marne (*L'Anthr.* 1934, XLIV, 683).

An article by Professor Maiuri on the past year's excavations at Herculaneum and Pompeii is printed in *The Times*, 30 October 1934, p. 13. In this he deals with the reconstruction of architectural remains found in previous years, which as he says must be replaced as far as possible in their original settings.

A fine example of a Roman cauldron, or camp kettle, has been recovered from the bed of the river Ouse, at York. It has special interest because of two inscriptions, or marks of possession, on the inside of the rim. The lettering is punched in a series of dots and is deciphered by Mr R. G. Collingwood as 'Centuriate of Attius Severus and Centuriate of C (?) Aprilius. The date of the cauldron, which is in very fine preservation, is considered as 1st century (*The Times*, 20 December 1934, p. 17).

The warlike tendencies of Primitive Man have been discussed in letters to *The Times* by Mr Gregory Bateson (13 December, p. 12) and Professor Elliot-Smith (20 December, p. 8) in reply to one by Dr William Brown (11 December, p. 12) on 'Psychology and War'.

The principles of Hellenistic architecture are considered in an article in *The Times* (8 December, p. 13) by Theodore Fyfe, Director of the School of Architecture in the University of Cambridge, based upon recent archaeological discoveries, particularly in Transjordan.

An account of a farm settlement of Roman times, and of the court-yard houses attached, found at Caerau Farm, near Pant Glas station in Wales, is given in *The Times* (29 December, p. 7) by Mr B. H. St. J. O'Neil, of H.M. Office of Works, who sums up his report as follows :

> ' It seems clear that this ancient farm and, doubtless, others of the type in the district, are the fruits of the *Pax Romana*, and of the encouragement given to agriculture, which must have been one of its principal features '.

The recent article in ANTIQUITY (December 1934) by Sir Cyril and Lady Fox on the forts and farms on Margam Mountain, Glamorgan, gives additional interest to this farm-settlement.

The Rome correspondent of *The Times* has received a report (printed 1 January 1935, p. 13) from Dr Luigi Ugolini,* Director of the Italian Archaeological Mission in Albania, of the most recent results of the excavation of Butrinto (Buthrotum) on the Albanian mainland opposite Corfu. Various constructions connected with the sanctuary of Aesculapius have been found, and also a fountain, with frescoed niche which may have been a shrine dedicated to the god of medicine. There are also some finely sculptured votive pillars and inscriptions, including one recording the honorary freedom of Buthrotum conferred upon a citizen of Corfu.

* Dr Ugolini's just published book on Malta will be reviewed in the next number of ANTIQUITY.

Some Recent Articles

This list is not exhaustive but may be found convenient as a record of papers on subjects which are within the scope of ANTIQUITY. *Books are occasionally included.*

Some notes on the Biggo bya Mugenyi [printed Bagenyi], by E. J. Wayland. *Uganda Journal*, vol. II, 21–32.

Notes with plans of defended sites and what appear to be earthworks designed to conserve water.

An Attempt to Cross-date Trees in Drowned Forests, by Charles J. Lyon and James W. Goldthwait. *Geographical Review*, October 1934, pp. 605–14.

The authors have investigated selected trees from the submerged forests of New England and Nova Scotia, and find that there is little or no correlation possible between their growth-ring diagrams. From this circumstance, since such correlation is simple when dealing with contemporary trees, they conclude that the submergence was a slow one, considerable periods of time elapsing between the killing of one tree and the next. J.G.D.C.

Pollen analysis : an outline of the problems and potentialities of the Method, by H. Godwin. Part I : Technique and interpretation. Part II : General applications. *New Phytologist*, 1934, XXXII, 278–305, 325–58.

These articles are important for archaeologists in that they describe the difficulties and complexities of the pollen-analytical method of reconstituting forest history. J.G.D.C.

Zur Bearbeitung der vorgeschichtlichen und neueren kleinen Rundbauten der Pyrenäenhalbinsel : separata da 'Homenagem a Martins Sarmento, by Frhr. von Richtogen.

An interesting illustrated account of modern primitive corbel-roofed ' beehive ' huts : compare M. Fournier's monograph, reviewed in ANTIQUITY 1934, VIII, 117. Of interest to British and Irish archaeologists, because these existing buildings are similar to some prehistoric ones in these islands.

Ancient ponds near Patcham, by H. S. Toms. *Sussex County Magazine*, August 1934, VIII, 486–90.

Ancient Ponds near Falmer : Broad Shackles and Buckland Bank, by H. S. Toms. *Sussex County Magazine*, September 1934, VIII, 546–50.

Mr Toms proves the pre-Roman antiquity of some of our downland ponds in two interesting articles illustrated by his own beautifully drawn and original plans.

Some aspects of Nandi stock-raising, by G. W. B. Huntingford. *Journ. E. Africa & Uganda Nat. Hist. Soc.*, no. 49–50, pp. 250–62.

Of interest to prehistorians who deal with pastoral peoples.

Equatorial Palaeolithic Varves in East Africa, by Gerard De Geer. *Geografiska Annaler*, 1934, pp. 76–96 and 2 ph.

After some preliminary remarks which do not concern East Africa, the author refers us to the important work of Erik Nilsson on the terminal moraines of Kilimandjaro, Kenya, Elgon and Ruwenzori, and on East African lake-deposits (*Geogr. Ann.* 1931, XIII, pp. 241–348; Stockholm, 1932). Nilsson considered also that he had found annual varves, with the reservation that each year may have had two rainy periods and two dry seasons, instead of half that number of annual ice-meltings in temperate and circumpolar regions. Layers of volcanic ash appear at intervals in the laminated deposits. De Geer considers that he has identified the records of these varves with sections of his Swedish time-scale, and of Halicki's series in Poland. Such strange coincidences of teleconnection cause one to think furiously.

The use of the names of constellations, and other terms to describe portions of graphs is perhaps a little confusing. The biennial maxima of the last thousand years before the end of the Ice Age in Sweden are included.

Most geologists are hard to convince, and there are some who still accept Penck's ice ages in the Alps but not in East Africa, and De Geer's geochronology in Sweden but not its teleconnection with North America and the tropics. Archaeologists might do well to remember this. K.S.S.

Geology and Geochronology, by Gerard De Geer. *Geografiska Annaler*, 1934, pp. 1–52 and 2 ph.

In this paper Professor Gerard De Geer gives us a detailed statement of his method of linking up annual-banded glacial clays (varves) on a world-wide basis (teleconnection), after explaining carefully his method of close connections (geochronology by varve-connections) in Sweden. It is a very welcome statement and should be studied from beginning to end by those who attempt long-range correlation of Quaternary climatic oscillations. They will learn much of the difficulties when they realize that De Geer and his very able pupil Ernst Antevs, now resident in North America, have come to diverging views on methods, interpretation, and values, which are discussed at length in the paper.

There is a valuable supplement concerning sources of error—twelve sources of physical error, six of observation—which should be sufficient warning to intending teleconnectionists to tread carefully. K.S.S.

The Role of the Desert, by A. J. McInerny. *Studies Publications, Channing Press, 8 Bream's Buildings, London*, 1933. pp. 43, with 10 illus. and maps. 4*s* 6*d*.

The thesis of this book is that civilizations owe their creation to men invigorated and disinfected by the pure ' electrical ' air and ozone of deserts—in fact an enlarged version of an old fashioned medical theory. The author's competence in archaeology —and English—may be illustrated by the following *literal* transcription of a representative passage:

'The formation of an advanced civilization in the Sahara and over North Africa created a barrier to the further penetration northwards of palaeolothic man of the Neanderthal type. Furthermore flint implements of the old palaeolithic period have been discovered in Gafsa (Tunisia) and in Constantine (Algeria), which, according to Chantre and other authorities are identical with the Chellean, Acheulian and Mousterian periods of Europe'. V.G.C.

Ancient Latin Cities of the Hills and the Plains, a Study of the Evolution of Settlements in Ancient Italy, by G. Säflund. *Opuscula Archaeologica*, vol. I, fasc. 1, pp. 64–86; edidit Institutum Romanum Regni Sueciae.

Säflund starts from the general position that city-life in Central Italy has moved from the hills to the plains and *vice versa* according to shifting economic and social conditions. The *oppida* of the Early Iron Age peoples were hill-settlements. After the 2nd Punic War, the Romans replaced them, according to Etrusco-Roman methods of town-planning, by cities built on the plains (it is shown by an examination of certain 'Latin' colonies that, before the 2nd Punic War, Rome contented herself with strengthening existing *oppida*, without moving them). In the Middle Ages there was a movement from the plains back to the hills, while at the present day the reverse tendency is again at work. R.C.C.

Place-name study in the United States of America: see references given in the *Geographical Review*, October 1934, pp. 659–60.

The early casting of iron: a stage in iron age civilization, by Thomas T. Read. *Geographical Review*, October 1934, pp. 544–54.

Drift Iron: a fortuitous factor in primitive culture, by T. A. Rickard. *Ib. id.* 525–43.

The Awash river and the Aussa Sultanate, by Wilfred Thesiger. *Geographical Journal*, January 1935, LXXXV, 1–23.

Contains a brief description, with illustrations, of modern types of grave and cenotaph, in stone and wood, in Eastern Abyssinia.

An evaluation of recent Nebraska finds sometimes attributed to the pleistocene, by Earl H. Bell and William van Royen. *The Wisconsin Archeologist*, April 1934, XIII, 49–70.

A severely critical and scientific examination of certain finds. The result is inconclusive, but leaves the door still open for pleistocene man in North America.

The beginnings of North and South in China, by Carl Whiting Bishop. *Pacific Affairs*, 1934, VII, 297–325. (Institute of Pacific Relations, 129 East 52nd street, New York).

The ancient highways and tracks of Worcestershire and the Middle Severn basin, by G. B. Grundy. *Arch. Journal*, 1934, XCI, 66–96.

Facts about the old road-system of this area, derived mainly from pre-Conquest documents.

ANTIQUITY

A ruined Nestorian city in Inner Mongolia, by Owen Lattimore. *Geogr. Journ.*, December 1934, LXXXIV, 481–97.

Contains photographic illustrations of stone slabs with Nestorian crosses carved on them.

Ancient Civilizations of the Santa Valley and Chavin, by Cornelius Van S. Roosevelt. *Geographical Review*, January 1935, pp. 21–42.

The Great Wall of Peru, discovered by aeroplane in 1931, examined on the ground. Other most interesting and well preserved remains found and photographed. We wish Dr Tello could persuade someone to make an air-survey of ancient remains in Peru; it is a promising land for this branch of research.

Ancestors of the Tuaregs, by E. F. Gautier. *Geogr. Review*, January 1935, 12–20.

Illustrations of rock-paintings, some of men in chariots claimed to be the Garamantes, whose capital Garama is now Jerma, in Fezzan.

The Scope of Economic History, by J. F. Rees. *History*, December 1934, XIX, 221–33.

This is a very readable review of six books, all of which seem, from the description given, to be most interesting. The reviewer claims that Mr Nef, dealing with the rise of the coal industry, ' has made it necessary to reconsider the economic history of the later sixteenth and the seventeenth centuries in the light of his thesis '.

Wat's Dyke: a field survey, by Cyril Fox. *Arch. Cambrensis*, December 1934, 205–78.

This concluded Sir Cyril Fox's survey of Offa's Dyke and Wat's Dyke, a fine example of a programme of field-work planned to cover a span of years and actually carried out in ten.

Books Received

Transactions of the Lancashire and Cheshire Antiquarian Society, 1932.

Guide to the Buddhist Ruins of Sarnath, *by* Daya Ram Sahni, Director General of Archaeology in India; 5th edn, 1933. 10 *annas* (1 shilling), Delhi.

The Downfall of Three Dynasties, *by* Count Egon Corti. *Methuen*, 1934. 16*s*.

Tiruparuttikunram and its Temples. *Bulletin of the Madras Govt. Museum*, N.S. *General Section*, vol. 1, part 3, 1934. 11 *rupees* 4 *annas*.

New History of Rye, *by* Leopold A. Vidler. *Combridge, Hove*, 1934. 12*s* 6*d*.

Matter, Myth and Spirit, *by* Dorothea Chaplin. *Simpkin Marshall*, 1935. 8*s* 6*d*.

Creation and Evolution in Primitive Cosmogonies, *by* Sir J. G. Frazer. *Macmillan*, 1935, 8*s* 6*d*.

Reviews

THE ORIENTAL INSTITUTE. *By* James Henry Breasted. Vol. xii of 'The University of Chicago Survey'. *Chicago : University of Chicago Press*, 1933. *pp.* 455, *with* 207 *illustrations and map of operations. Price not stated.*

This publication, the 12th and final volume of the series comprising the University of Chicago Survey, is in every respect as complete and satisfying a piece of work as we have come to expect from Professor Breasted.

The Oriental Institute is a truly amazing organization, since it has advanced from nothing to its present impressive dimensions entirely during the post-war years, and very largely by the tireless efforts of Professor Breasted himself, who has been the mainspring of the whole concern. Its present activities cover the following areas :—Persia (Persepolis), Iraq (Khorsabad, Tell Asmar and Khafaje), Syria (Kalneh), Anatolia (Alishar), Palestine (Megiddo), Egypt (epigraphic, architectural, and tomb paintings, Luxor ; mastaba paintings, Sakkara ; temple reliefs, Abydos ; coffin texts, Cairo ; and a Prehistoric survey). In addition to these there are several preliminary excavations going on at various sites, and there is the compilation of an Assyrian dictionary, which is alone a task of great magnitude.

Even Professor Breasted himself describes this as an ambitious programme which should be carried on for centuries, but it is none too ambitious for the tremendous importance of the task undertaken. Although excavations have been carried on in Egypt for the past century, it is only now that the rich area of the 'intercontinental bridge' from the Nile to the Euphrates is being adequately dealt with. As Professor Breasted states, this is undoubtedly the cradle of the culture of the Old World, and the results to be expected are of inestimable significance.

When we consider the formerly accepted methods of conducting expeditions in Egypt and the Near East—methods tied hand and foot by an old-fashioned outlook on archaeology—it is a matter for profound gratitude that the Oriental Institute has arisen to set a standard of work which has not hitherto been attainable. It is not suggested that the Oriental Institute alone has escaped from the thraldom of obsolete methods and procedure, but it is beyond question the first to be able to carry out a programme on a proper scale unhampered by lack of funds.

This question of funds has always been the bugbear of archaeological field-work ; and is to a great extent unavoidable since the average important subscriber has usually little or no archaeological knowledge, and his interest requires the stimulation of objects found and displayed. More often than not these latter are of greater scientific than general value, and frequently a scientifically successful expedition may have no objects whatever to display. For instance, the first season's work which the present writer carried out on the Middle-Kingdom Egyptian fortress of Mirgissa in the Sudan entailed months of work with hundreds of natives shifting thousands of tons of sand, merely to uncover a small portion of the encircling ditch and ramparts, without the discovery of a single object. Subscribers often fail to see the point of such labour.

The Oriental Institute has been more than ordinarily fortunate in the broad outlook of its 'fairy godmothers'. Mr John D. Rockefeller, jr., has been from the beginning

of the Institute's development the principal pillar of its financial structure. The generosity of the Institute's supporters has enabled it to employ the best men available in each branch of the work, and to skim the cream from most of the dormant or defunct expeditions which have suffered from lack of funds, causing restriction and curtailment of activities ; and has also enabled it to build throughout the wide field of its activities what are really the first adequate quarters provided for any field-expedition anywhere. The workers can thus live in reasonable comfort in unpleasant climates, such as are found in most of the Near East, and, as a natural result, can work at the maximum efficiency.

The rapid growth and wide ramifications of the Oriental Institute have naturally stirred up against it a certain amount of adverse criticism, and not a little jealousy—that curse of archaeological as of much other scientific work. Particularly was this the case in Egypt during the first few years, and much of it can be traced to the Institute's offer of a new National Museum to the Government of Egypt. These negotiations, unfortunately, fell through.

Most of the general criticisms of the Institute, however, can be traced to motives which scarcely deserve serious attention, and reflect little credit on their originators. One is that the Institute's buildings are on too grand a scale, and that money thus spent might have gone most profitably to archaeological work. What such critics need to remember is the scale of the whole undertaking, and that the day of the small seasonal excavations, here today and somewhere else tomorrow, where the staffs operate under conditions of discomfort and poor food (to the detriment of their work) is drawing to a close. Not only are Departments of Antiquities everywhere insisting on a standard of excavation and record which renders such concerns impossible, but the standard demanded by new students of archaeology and by the world at large is vastly higher than it was even a few years ago. The Oriental Institute has built differently, and the quality of the results even at this early point in its progress is sufficient reward for the ' experiment '.

Another peg for criticisms is the question of the suitability or otherwise of the various expedition buildings for the purposes they are intended to serve. From personal acquaintance with the different Luxor houses, and with that at Bedrashein (for Sakkara), there would seem to be no grounds whatever for any such criticism ; and the descriptions and illustrations of other buildings in Professor Breasted's book show the care with which each house has been individually planned for its special purpose. There were in the beginning certain inevitable 'snags', owing to the architects having to plan for conditions climatic, and otherwise, which were strange to them. But the experience gained from the first buildings has been taken full advantage of to avoid such minor unsuitabilities as were inevitable at first. The new Headquarters at Luxor, the Expedition Houses at Megiddo, Alishar, Chatal Hüyük, Tell Asmar, and the American Headquarters at Chicago are all sufficiently clearly illustrated and described in the book to show this.

Among the many familiar names of workers whose reputations were already made in Egyptology before being brought into the service of the Oriental Institute, one of the most welcome is that of Amice Calverley, of whom the Professor says :—' It is difficult to say too much in praise of the magnificent work . . . No better draftsmanship has ever been available in the service of archaeology, . . . the writer . . . feels the question may be fairly raised whether any drawing as good as this has ever before been done in Egypt '. Those who saw Miss Calverley's first work in Egypt, before she joined the Oriental Institute, and when she was with Professor Junker and others at Giza, said very much the same thing.

Certainly the Oriental Institute has taken full advantage of its unique opportunities

for acquiring the best talent available in each branch of the work undertaken, and there can be nothing but praise in this respect.

The Director of the University Survey, in a foreword to the volume, voices the hope ' that this extremely interesting document may induce other large research enterprises to make corresponding analyses of their activities ', and one can heartily endorse that hope.

NOEL F. WHEELER.

EXPLORATIONS IN SIND. *By* N. G. MAJUMDAR. *Memoir* 48 *of the Archaeological Survey of India*, 1934. *pp.* III, 172 *and* 46 *plates, including map of Sind.* 27*s* 6*d.*

This is an important work dealing with the results of survey in Sind for the Archaeological Department of the Government of India during the winter seasons 1927–8, 1929–30 and 1930–1.

The primary object of this survey was to ascertain the nature and probable period of the many deserted mounds that were known to exist in Sind, and Mr Majumdar has proved beyond any doubt that he was eminently suited for this very onerous undertaking. This account of his investigations will be indispensable to every student of ancient pottery.

In his first short season the author made a thorough examination of the mounds of Jhukar, 16 miles north of Mohenjo-daro, one of which is 63 feet high, and found there two kinds of prehistoric ware, the earlier of which is well represented at Mohenjo-daro. The upper strata of the mounds yielded Indo-Sassanian pottery and other objects.

In the season 1929–30 he traversed some 2000 miles of the Indus Delta country and examined over a hundred ancient sites.

A further survey in 1930–1 took him northwards along the Indus where he photographed and examined a considerable number of hitherto unexplored sites. A third journey was contemplated for 1931–2 to test the ground in eastern Sind, a great deal of which is desert, but this had to be postponed owing to the financial depression that involved India equally with other countries.

One of the most important results of this survey was the finding, first at Amri in Lower Sind and later at other sites, of a culture that evidently antedates that of Mohenjo-daro and Harappā ; the pottery produced by this people was entirely dissimilar to the black-on-red ware that is so common in the latter two cities. It is wheel-made, thin, and decorated with geometric designs in two colours on a pink or cream slip or wash, and it is identical with some of the wares unearthed by Sir Aurel Stein in southern Balūchistān. It was found in a dark-earth stratum beneath deposits containing the black-on-red ware of the Indus Valley cities. The people who made this ' bichrome pottery ', as Mr Majumdar terms it, but which I should prefer to describe as ' polychrome ', including the slip on which the colours were applied, lived in stone-built habitations and evidently had a quite advanced civilization. But apart from the pottery that they made, we at present know little about them ; few other objects were found, since the nature and terms of his survey prevented Mr Majumdar from making extended investigations on these particular sites. It is hoped, however, that more extended excavations will shortly be made, the results of which should be of the utmost value in the interpretation of the prehistory of India.

As is well known, both Mohenjo-daro and Harappā, situated as they are in the alluvial plain of the river, are built entirely of burnt brick ; but that other and more convenient materials were on occasion used by the people of the same civilization is proved by two sites on rocky ground close to the Khīrthar Range being constructed largely of stone.

At a site named Kohtras Buthi, on the top of a hill some 48 miles northwest of Hyderabad, stone ramparts and bastions were built of large boulders without the use of mortar; and as far as could be seen they enclose an extensive quadrangle filled with the stone foundations of houses, whose superstructures were made of some other material, possibly unburnt brick or mud and wattle. The few sherds found in and around this fortress, and a couple of well-preserved clay tumblers prove it to be the work of the same people who built Mohenjo-daro. Further north at Ali Murad, some 65 miles southwest of Mohenjo-daro, a long recessed stone rampart constructed of roughly dressed blocks, averaging 2 by 1 by 1 feet, was traced a distance of some 170 feet; it still stood some 5 feet high in places. This wall also apparently enclosed a settlement and it had at least one well defined entrance. The painted pottery found at Ali Murad belongs to the same period as that of Kohtras.

No fortifications have as yet been found at Harappā and the question of a city wall at Mohenjo-daro had unfortunately to be left unsettled; but the existence of two hill-forts, one comparatively close to the latter city, leads one to suspect that the cities of the plain were also fortified. Ali Murad commands the Phusi Pass which caravans still use, and it therefore required strong protection from raids by the tribes of Balūchistān, which people, there is strong reason to believe, were a constant menace to Mohenjo-daro in the later stages of its occupation.

It is northwards from Hyderabad that the prehistoric sites of Sind exist in profusion; but well south of this modern town three prehistoric settlements were identified by Mr Majumdar, one of which, at Tharro immediately below Tatta, is studded with innumerable flint flakes and is thought to have been a flint-knapping station. This definitely shows this southern part of Sind to have been dry land in prehistoric times. By far the greater number of sites, however, are situated between the present bed of the Indus and Balūchistān in a chain some 180 miles long; but the eastern side of Sind, now for the most part stark desert, may produce more sites when it has been examined. One very large and particularly important site on the eastern bank of the Indus almost opposite Amri is Chānhu-daro, where in the short time that he was able to devote to its examination, Mr Majumdar unearthed a considerable amount of material. Seals like those from Mohenjo-daro, painted wares, pottery figurines, one in particular of a type quite new to us, and clay animals, as well as an etched carnelian bead, convinced him that this large site was inhabited by people of the same culture as Mohenjo-daro. The exceptionally fine pottery found here is, however, of a much better quality than any from Mohenjo-daro; and this fact has led Mr Majumdar to express the opinion, which the reviewer shares, that Chānhu-daro is of earlier date than the former city though the culture is the same. The two large painted storage jars from this site that he illustrates were found not far below the surface, and in the profusion of their decoration and its careful delineation they are far superior to anything that has been found in the northern city.

In a chapter entitled 'General Observations', Mr Majumdar sums up the results of his work. He points out that none of the prehistoric sites were reoccupied after their desertion, and that they are far away from the present habitations of man. With Sir Aurel Stein he is inclined to agree that the cause of their desertion was desiccation, and he suggests that the inhabitants moved gradually to the eastern and more humid parts of India, where, the reviewer would like to add, they were probably finally absorbed by the existing people, and lost their identity in the enervating climate.

Several prehistoric sites round Lake Manchhar have yielded painted pottery and chert flakes which were found embedded in the water-logged silt, and Mr Majumdar's

observations have led him to believe that lake-dwellings existed in prehistoric times round this large sheet of water.

The author's analysis of the various kinds of pottery found by him at the sites that he visited can be usefully summarized as follows :—

(A) The earliest : three-coloured, thin, unpolished ware of pinkish clay, with geometric patterns. Found for the first time in Sind at Amri, and subsequently at a number of sites in Western Sind. The shapes of these vessels are not unlike some that have been found at Nal, of which they could well be the prototypes. The colours used are black, chocolate or a reddish-brown, sometimes on a slip or wash of buff or light red colour.

(B) Well-baked thick ware ; with designs that are rarely wholly geometric painted in black on a well polished, red slip. Particularly fine examples were found at Chānhu-daro, and a later and more decadent variety occurs at Mohenjo-daro, where unpainted wares became more common than the painted.

(C) Thin ware ; decorated in black or chocolate on a light red or buff slip, with in some cases a reddish-brown band at the neck. Plants or flowers, sometimes very stylized, are common motifs. Mr Majumdar is uncertain to what period to assign this particular ware, and he suggests that it may be late prehistoric, like some of the pottery of Jhukar and Lohumjo-daro.

(D) Black ware ; with incised geometric patterns, found at Jhangar near Lake Manchhar associated with a little painted pottery. This black ware is compared by Mr Majumdar with some of Early Iron age found in the Madras Presidency. Black ware, or rather a grey ware with a black slip, is fairly common at Mohenjo-daro ; but only one specimen has been found that was incised and this came from a high level.

Mr Majumdar is unable to trace the development of the second class of pottery from the first, and he rightly, it seems to me, regards the two as the products of entirely different cultures. Class B, it appears, extended over a considerable range of time, at first in universal use and then gradually succumbing before the plain, unpainted ware. It would seem, therefore, that the early polychrome and more simple ware (for we must also take shape into consideration) was made by a people who occupied Balūchistān and Sind, and possibly other parts of India, in very early times, but who, it would appear, together with their wares gradually gave place to another culture—it may be, a more highly civilized people—whose identity as well as that of the first group has now been lost. Whence did the people who made the class B pottery come ? Mr Majumdar suggests that as the ibex appears on the black and red pottery of the hilly region of western Sind, principally on the wares from Karchat, it was from the highlands to the west, a conclusion that has already been arrived at by others on other grounds.

A few misprints in this most useful book by no means detract from its importance, and the author is to be congratulated both on the success of his explorations in the field and on having presented his material in a very able manner. ERNEST MACKAY.

THE ATHENIAN ASSESSMENT OF 425 B.C. *By* BENJAMIN DEAN MERITT *and* ALLEN BROWN WEST. (*University of Michigan Studies : Humanistic Series, vol.* XXXIII.) *Ann Arbor : University of Michigan Press,* 1934. *pp.* XIV, 112, *with* 2 *plates and* 17 *figs.* $2.50.

No Greek inscription, perhaps, has evoked a keener interest, or confronted students with more serious problems, than that which records the decree of 425 B.C., ordering a re-assessment of the Athenian Empire, together with the appended schedule containing

a list of its component members and the sum at which each was assessed. The document was re-edited in 1924 by Freiherr Hiller von Gaertringen (*IG.* I^2, 63) and in January 1933 by the present reviewer (*Selection of Greek Historical Inscriptions*, no. 66). I then acknowledged gratefully my indebtedness to Professors Meritt and West, not only for the help received from their published works, but for their generosity in keeping me abreast of the results of their minute examination of the stele and their successive attempts to reconstruct the text down to the late summer of 1932, and I expressed the hope that they would themselves publish the text with an adequate commentary. That hope is now fulfilled and in the book before us we have an edition which must unhesitatingly be preferred to all its predecessors. Not that the last word has now been spoken: it is not the task of a work such as this to cry a permanent halt, but rather to consolidate the position already won and so prepare the way for a further advance. Nevertheless, unless and until new fragments of this inscription, or of the duplicate erected in the Council House (line 24), come to light, the present volume must remain the basis of all serious study of the important document with which it deals.

Chapter I contains a detailed inventory of the 43 inscribed fragments of marble (of which 25 are illustrated[1] by excellent photographs) which have survived from the massive stele.[2] A full bibliography of each is given, with notes on its contents and contacts. The editors have wisely decided to number the fragments afresh, 'following approximately the order in which they should appear in the text of the inscription' (p. 1), and have thus freed us from the awkward references inherited from the first edition of *IG.* I.

In chapter II the materials thus collected, which include three small fragments (4, 17, 18) hitherto unplaced, are assigned to their positions in the stele. The resultant reconstruction, carried out in 1933 in the Epigraphical Museum at Athens, is shown in a diagram (fig. 16) and in a photograph (fig. 17), which vividly suggest the extreme difficulty of the undertaking essayed by a long succession of scholars (see the bibliography on p. 43) and carried so much nearer to its goal by Professors Meritt and West, aided by the 'helpful criticism' of Professor W. Kolbe and Mr H. T. Wade-Gery.

Chapter III comprises a restored text of the decrees and of the heading prefixed to the appended assessment-list, together with a translation and a full commentary. Despite the fragmentary nature of the stele, the reconstruction offered is so thoroughgoing that nothing, with the exception of a few proper names, is left unguessed at. That the text so won reproduces exactly the words of the original the editors do not assert. Notwithstanding the invaluable aid derived from the *stoichedon* arrangement of the letters and the fact that the stone is 'one of the most carefully inscribed of all the documents of the fifth century' (p. 54), the task of restoring the inscription presents well-nigh insuperable difficulties due to the unique nature of its content and its consequent failure to conform to familiar formulae. The modesty of the editors' claim that 'the restorations offered . . . give at least the general sense of the inscription' (p. v) disarms criticism of particular words and phrases and is as creditable to them as is the meticulous care and unflagging industry displayed in every part of their work.

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[1] One fragment (6) is lost: the remaining seventeen (21–31, 35, 39–43) were illustrated in West's article in *Metropolitan Museum Studies*, III, 174 ff. As that article is not widely accessible in this country, I cannot but regret that the photographs there published have not been reproduced in the book before us: they would have materially increased its usefulness without adding unduly to its bulk or cost.

[2] These do not include *IG.* I^2, 151, which, to judge by the character of the script, may possibly come from the latter part of the inscription.

In the fourth and final chapter the authors discuss the assessment-list which follows the decrees, arranged in four columns, each of at least 113, and more probably of about 120, lines in length, inclusive of some lacunae left uninscribed between one district and the next. To the four districts familiar to us from the quota-lists after 440 B.C. two further groups of cities are added—one consisting of thirteen 'Actaean' cities, added to the Empire after the failure of the Lesbian Revolt, and one of a considerably larger number of Pontic cities. Finally, an attempt is made to determine a 'minimum' and a 'probable' figure for the total assessment of each of these six areas and so for that of the whole Empire, resulting in the unhesitating acceptance of the view—strongly advocated by Kolbe, but hitherto combated by the authors in common with the great majority of scholars—that the grand total amounted to a sum of 1460–1500 talents. Three invaluable indexes, one of which registers all the known Athenian tributaries[3] and another the significant Greek words,[4] and two plates bring the volume to a close.

The beauty of the printing, the scrupulous care with which the proofs have been read[5] and, above all, the lucidity, sobriety and cogency of the argument make it a sheer delight to read the book. Where so much is given, it may seem ungracious to ask for more: yet a table of concordance between the old and the new numeration of the fragments would save the student appreciable time and trouble, while some reference should surely have been made in chapter I to the provenance of the fragments. With an appetite whetted rather than satisfied we look to the authors to give us a comprehensive study of fifth-century Athenian finance, among the materials for which the present document will take an important place. In that study they will doubtless deal with questions raised, but not answered, in the book before us, as for instance, how they interpret the fragments left to *IG.* I,[2] 64 (see p. 19), which they still maintain (in opposition to Kolbe) is not a second copy of the same document as *IG.* I[2], 63 (pp. 24 f. 81f. 84).[6]

MARCUS N. TOD.

PARTHIAN POTTERY FROM SELEUCIA ON THE TIGRIS. *By* NEILSON C. DEBEVOISE. (University of Michigan Studies, Humanistic Series, vol. XXXII). *Ann Arbor: University of Michigan Press*, 1934. *pp.* 132, 16 *plates and* 423 *figs.* $3.

In all the great archaeological expeditions in Mesopotamia Parthian pottery has been excavated, but these finds from Nineveh, Ctesiphon, Babylon, Nippur and many other sites were unimportant compared with the extraordinary objects from earlier levels. Hence they do not play a prominent part in the archaeological reports, so that our knowledge of the Parthian wares has been on the whole rather vague. The campaigns at Seleucia from 1927 to 1932 undertaken on behalf of the American School of Oriental Research in Baghdad under the auspices of the University of Michigan and supported by the Museums of Toledo and Cleveland have, however, quite changed the situation. An enormous amount of well-preserved pottery was excavated—in two seasons alone nearly 1600 pieces—and it is excellently described in Mr Debevoise's well-illustrated book.

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[3] On p. 93 we must read [Ἀλονήσ]ιο[ι] and on p. 97 Ναξιᾶται παρὰ Μύριναν and, probably, Οθώριοι (cf. Θέστωρος, Πίλωρος, both in Thrace): What of the [Μυ]γισσῆς of *SEG.* V, 4. IV. 19?

[4] For μηδεμίᾳ (pp. 45, 104) read μηδεμιᾷ, for πρήθουσα (p. 107) πλήθουσα, for πορευθήσωνται (p. 106) πορευθήσονται (as on p. 105).

[5] On p. 19 'L. Franz' should be 'J. Franz', and 34 should be added to the fragments removed from *IG.* I[2], 64; on p. 43 'O. Müller' should be 'I. von Müller'.

[6] Why should 8 rather than 13 talents be restored in *IG.* I[2], 64 as the assessment of Antandrus (p. 81)?

These finds from Seleucia are especially significant scientifically, because, despite the fact that the Parthian period lasted here only about 340 years (141 B.C.–*c.* A.D. 200), they were found in three different levels, thus providing accurate dating for nearly all pieces. This alone will make Mr Debevoise's book indispensable for all further excavators in Mesopotamia, for with its help other Parthian potteries can now be readily dated. Two important circumstances have, however, to be considered, while making use of the material: the geographical situation of Seleucia and its strong Hellenistic heritage make it representative only of the westernmost part of the Parthian Empire; and the excavations have proven that the town steadily diminished in its importance on account of the strong competition of the newly founded Ctesiphon, a decline only too visible in the potter's craft, as the later wares are all far more carelessly manufactured and glazed.

Mr Debevoise establishes and gives a general discussion of 417 types, all reproduced in drawings; he then considers the character of the glazes, supporting his statements by several quantitative and qualitative analyses; and adds finally an exhaustive catalogue of all types. From an artistic point of view the pottery is on the whole rather poor, only occasionally pleasing by graceful shape, a fine profile or, more rarely, by some artistic decoration. The pottery is, however, very often impressive by virtue of the sturdy shapes, expressing a strong and effective character. The glazed wares have on the whole a simpler ornamentation than the unglazed ones, especially the lamps, as the thick glaze would conceal finer or more intricate patterns. The material discussed contains many odd types, such as toy fountains with turtles and fish; saving-banks with slots to insert coins and an apparatus apparently used to soften bullae to receive seal impressions. A kind of dark lantern (similar to nos. 350 and 351) had already been published by J. P. Peters, who found it in Babylonian graves at Nippur (*Nippur* II, pl. VI, 61), while a drinking vessel, a kind of amphora with a spout at the lower end (nos. 176 and 177) seems to be the simple forerunner of the grandiose rhyton in the Kelekian Collection in the Victoria and Albert Museum, which is, however, wrongly repaired;* the decoration over the spout on these Seleucia vessels represents bovine horns, being the last relics of an entire bovine head such as is found on similar Parthian drinking vessels recovered in Persia and Mesopotamia. One may regret that Mr Debevoise does not include in his survey of the Seleucia pottery the most remarkable achievement of the potter's craft, the coffins. Examples both of the bath tub and the slipper-shaped sarcophagi were excavated. The fact that the latter were found only after the third level (141 B.C.–A.D. 43) had been reached, seem to solve the difficult problem of their date. Unfortunately none of the stately amphorae, a common Parthian type and represented in nearly all the greater collections, have been found, so that their date is still uncertain. A very important decoration on these amphorae, little disks and knobs usually applied near the handle, could however be traced on several jugs and lamps of the second and first level (A.D. 43–200), thus proving that this device was in use in late Parthian times. Only very few examples of two-colour glazing were discovered, nearly all on lamps. This process is in these cases due not to an artistic, but to a practical intention, as the dipping of the nozzle of the lamp in a second glaze served to make it more resistant to the heat. It is an important fact that no lead glazes have been traced among the Parthian wares and that 'most of the glazes analysed were alkaline silicates with an oxide added for colour' (p. 30). The pottery was nearly all locally made—the expedition discovered also a

* F. Sarre, *Die Kunst des alten Persiens*, *Berlin*, 1922, pl. 147.

kiln—and the potters' repertoire included even such a purely Greek shape as an askos. The only imported wares were Roman Arretine pottery and a few vessels from the eastern part of the Parthian Empire. The catalogue contains also many pre-Parthian (Seleucid) potteries, thus enabling us to get a somewhat clearer conception of the historical development; it includes furthermore a graceful greenglazed bowl, whose supposed Sassanian origin is well proven by a very similar piece found in the Sassanian level at Kish and now in the Field Museum, Chicago (Nippur, K–1758).

R. ETTINGHAUSEN.

HOOTON PAGNELL: the agricultural evolution of a Yorkshire Village. *By* ARTHUR G. RUSTON *and* DENIS WITNEY. *Edward Arnold, 43 Maddox st., W.1, 1934. pp.* VIII, 459, *and* 12 *plates*, 58 *text-figures.* 25*s.*

By those familiar with Dr Ruston's work over many years in the collection of records of all kinds illustrative of farming in Yorkshire, from pre-Domesday times to the present, this volume has been awaited with greatest interest. The authors in their collection of material have taken a particularly wide view of agriculture, recognizing it as the essential basis of the English village life and economy, affecting almost every aspect of the peoples' lives. By choosing as example a village with very complete records over a range of nearly a thousand years, it has been possible to trace not merely the economic history of the farming and systems of land tenure, but to give a strikingly complete picture of the village life and customs, and to relate this by quoted example to comparable and contrasted villages in many parts of Yorkshire and even in many parts of England.

The village of Hooton Pagnell is at present somewhat exceptional in being entirely the property of one landlord, with the exception of the few acres occupied by the North Eastern Railway. This single ownership has been arrived at comparatively recently, and has had the happy effect of bringing into a single muniment room, that of the Hall, a very complete set of deeds, surveys, leases, etc. These, along with the parish church chest, the churchwardens' accounts, and the tithe awards, have been supplemented by considerable study of existing traces of ancient fields, balks, field-names, etc, throughout the parish.

A detailed view of the parish of today is first given, with clear description of the farms, methods of farming, and the outstanding problems facing the farmers at present, leading to a set of pertinent questions which the rest of the book attempts to answer: *e.g.* How came the farms and farm lands into the possession of the present owners? In what way have the privileges and responsibilities of ownership been evolved?

The Domesday village is discussed after a very clear account of the making of the survey has been given, and like all the sections in the book this is accomplished largely by quotation and brief comment upon original documents. The extent and nature of the farm lands, meadows, woods, and common pasture are illustrated by surveys and in some cases plans, from the 12th to the 16th century, and the duties and services of the inhabitants of the manor made clear. The next section gives a survey of the open-fields prior to 1595, and then traces the consolidation of holdings by exchange of strips and later by enclosure, and the changes in the control of the Common and Commons Rights up to an award as recent as 1929. This is probably the most completely documented and detailed account of the whole process of evolution from the open-field strip holdings, to the present day farms, that has yet been published for any one area. The illustrative maps showing the evolution of individual farms and farm holdings are most valuable, and all interested in manorial history will find this chapter of constant

value for reference. Systems and methods of farming introduce the question of ownership, and this is treated in detail, an interesting table being that showing owner, how acquired, relation to previous owner, etc., from the Saxon earl Edwin, to the last change of ownership in 1931.

A section of particular interest to the manorial historian deals with the changes in land tenure and position of tenants since those set out in the 10th century Rectitudines. A very detailed survey of the manor under the feudal system is succeeded by a study of the methods of commutation of services fully illustrated by abundant leases. The customs of the manor, tenancy by indenture, improvement leases, etc., will in their discussion be of use in interpreting the import of many old deeds and leases encountered by the local historian in any area. An interesting link with the 14th century is the ownership of the manor by the Louterells from 1215 to 1419, and the fact that the Geoffrey Louterell who commissioned the preparation of the Louterell Psalter was so closely connected with this manor. It may be that some of the illustrations of the Psalter are drawn from the very fields and farms studied.

The later part of the book deals with two questions of much present topical interest, the evolution of tenant-right and of glebe and tithe. These sections are particularly full for the more recent years, especially for the 19th century, and will take their place as a substantial contribution to the present problem of tithe adjustment.

The book is somewhat hard reading from the uniform method adopted of quotation of documents in sufficient detail and abundance to make very little comment necessary. This vastly increases its value as a safe work of reference, and makes all the more welcome the considered judgments given on present trends in farming practice and problems. The make up of the book is very pleasing, and the illustration very well chosen. Many gems from the Louterell Psalter and similar documents lighten the numerous farm and parish plans of various dates. The plates are good and well chosen. It is perhaps allowable to mention one error which has little bearing on the subject of the book : that is the titling of plate 5, where an excellent photo of the strip lynchets at Carperby is described as of Celtic lynchets ! It would also have been a welcome addition if some details of the Hall, church, and glebe land, with a larger scale plan of the village, could have been added. Many readers in the North, however, will certainly wish to visit and explore the village further, and will supply this want themselves. A. RAISTRICK.

L'INDUSTRIE DES ATELIERS A MAILLETS DE MURS. (Extrait du Compte Rendu de la Xe session du Congrès Préhistorique de France, 1931, pp. 146–79, 17 plates and 18 figures). *By* A. VAYSON DE PRADENNE. *Le Mans*, 1934.

M. Vayson de Pradenne has again placed prehistorians in his debt by a masterly summary of an intricate problem. On this occasion he has turned his attention to the series of workshop-sites on an outcrop of chalky limestone, some 200 yards wide and between 3 and 4 miles long, near Murs in Vaucluse (Provence). The intense exploitation of this limited area was due to the excellent character of the flint and to the unique disintegrating structure of the rock. Characteristic of the site are numerous ovoid hammer-heads, many of which bear a central encircling groove for hafting, made from the local rose-coloured quartzite. Definite proof has been obtained of their use in extracting the flint by shattering the rock. Previous writers have focused attention on ' les maillets ' to the exclusion of the associated flint-industries here studied by M. Vayson de Pradenne. From the debris of the flint-knapping workshops come ' tortoise cores ', cores of Aurignacian type with two striking platforms and of Neolithic type with

one, many of these being worked up as planes. Points and side-scrapers of Mousterian tradition, blades of Upper Palaeolithic facies, racloirs, tranchets and carinated fragments analogous to Campignian picks are common, but scrapers and blades trimmed on both faces, allied to Neolithic forms, predominate. This industry has been assigned to all periods from Mousterian to early metal age according to the relative significance attached to the flint artifacts and to the hammer-heads. The homogeneity of the industry is, however, beyond question. The writer concludes that the evidence of the quartzite hammers, the presence of a decadent flint industry and the vast scale of this industrial exploitation, all indicate a date at the dawn of the metal age—a fact of the utmost significance, delivering a ' coup-de-grace ' to the arguments still advanced for dating based solely on typological affinities.

It should be added that this paper is well illustrated though the absence of a scale on the line drawings is annoying. RAINBIRD CLARKE.

DIE GERMANISCHEN VOLLGRIFFSCHWERTER DER JÜNGEREN BRONZEZEIT. *By* ERNST SPROCKHOFF. *Römisch-germanische Forschungen, bd.* 9. *Berlin : W. de Gruyter,* 1934. *pp.* 142 *with* 44 *plates.* 24 *marks.*

This study of the ' full-hilted ' swords of the later Bronze Age in central Europe follows the author's earlier work on the Germanic flange-hilted (tongue-grip) swords, reviewed in ANTIQUITY, September 1932, p. 376. Its format is the same, and it is similarly enriched by many excellent plates and distribution-maps. These show, with few exceptions, the entire distribution-area of each sword-type, and they mark a great advance in the study of these significant weapons and of the cultures they represent. The symbols are well displayed in red ; and the only criticism that might be levelled at the maps is that they attempt to portray high ground by means of disconnected hachured masses in place of selected and clear, if generalized, contours.

Like other workers, Sprockhoff is almost exclusively concerned with the shape of the haft in his classification and typological analysis : he has little to say about the blades. He recognizes two swords which are strictly ' Nordic ' in origin and distribution—the horn- and kidney-pommelled varieties. Both were evolved in the Danish islands in Montelius IV ; but the centre of gravity shifts in Montelius V to the middle Elbe region, the meeting-place of trade routes from Italy and the eastern Alps and from northwest Switzerland. Throughout the late Bronze Age close contacts with the south are evident in north Germany, and the ' Nordic ' culture changes its character henceforth ; it is transformed from an intense but narrowly circumscribed culture to one of varied content and wide-spreading influence. Of three well-known and characteristic swords dealt with—the Auvernier, Möriger and Antenna types—the Auvernier sword reveals by its distribution the close relations between Germany and Switzerland (where it was evolved), while the Antenna sword illustrates the connexion with Italy. The Italian specimens are all of the simple-spiral class, but that the type did not originate there is proved by the absence of transitional examples such as are found in central north Germany.

Sprockhoff follows earlier investigators in recognizing a Hungarian prototype for the Möriger sword. His map provides no justification for the alternative title, ' Rhône valley type ' : only 6 French examples are marked in the Rhône-Saône area, while there are over 100 listed from central and north-central Europe. He mildly questions the accepted belief in a Swiss origin, arguing that the type may well have originated in the middle Elbe. He is none the less impressed with the vigour of the west Alpine culture, and cites instances of the trade carried on with north-central Europe.

A sixty-page catalogue of the five sword-types considered is a valuable feature of the volume ; there are over 400 entries, and information is given as to the find-associations, literature and present whereabouts of each sword. Of rather special interest to English students is the fragment of the haft of an Auvernier sword from the Croydon hoard (pl. 35, 6) which seems to have passed unobserved. E. Estyn Evans.

STATUES-MENHIRS, STÈLES GRAVÉES, DALLES SCULPTÉES. *By* Commandant Octobon. *Revue Anthropologique* 1931, *pp.* 299–579. (Sold as a separate publication in paper covers by M. Emile Nourry, 62 rue des Ecoles, Paris 5^{e} ; price, omitted from the title-page, 30 francs).[1]

Scattered over the Old World from Central Asia to Brittany and from Central Europe to Abyssinia and the Sudan, there may be found certain curiously carved upright stones. They are called ' statue-menhirs ' by the French ; an alternative name ' dolmen idols ' is less satisfactory, because they are not invariably associated with ' dolmens ', though often forming a unit in the megalithic culture-complex. Descriptions of these stones have appeared in countless books and learned transactions, and it was high time that someone should attempt to codify them. The first attempt is not an unqualified success, but it is much better than nothing at all, and it does provide a useful ' catalogue raisonné ' of the French examples. If, as Professor Breuil says in the preface, the foreign portion of the monograph is less well documented, that is of course because a ' provincial ' has not access to those foreign publications which are indispensable for such a task. This may account for, but does not excuse, the omission of any reference to the standard work on such subjects as the Easter Island statues (p. 507) ; it may also account for the amazing statement that this island has disappeared into the ocean ! ! (disparu dans l'océan).

It would be wrong not to express a measure of qualified admiration for the industry which has produced this book ; but with a little less elaboration it might have been much better and much more easy to use. Being primarily a book of reference (with the exception of section 4, the best and most readable portion) it should be easy to refer to, and that it emphatically is not. The catalogue (section 3 : ' description sommaire ') appears at first sight to be arranged in no sort of order, and in the absence of any index or paginated list of contents, one is lost. The descriptions of items are headed by the department, but they are not *grouped* under departments ; and it is only after prolonged examination that one discovers (on p. 367) the heading ' IV^{e} groupe ', implying some system of classification. Further research reveals the fact that the items on pp. 310–67 are in fact classified according to the scheme set out on pp. 306–7, but apparently the author forgot to insert the headings until he came to group 4. There is a further complication in that the sub-headings given in the text are not verbally assimilated to those in the ' essai de classment '—the only place where the author's system is explained. The mania for classification is carried even to the extent of forming sub-groups ; but, after working through the first six groups, the author seems to have given up the task.

The fact is that M. Octobon has never really thought out the first principles of classification. He rejects (on p. 305) the geographical method adopted by Dèchelette and all modern students because it suggests ' groupements géographiques que la réalité ne sanctionne pas toujours rigoureusement '. We do not understand exactly what this means. But while rejecting the geographical method of classification, he is forced to

[1] We apologize for the long delay in publishing this review. The archaeologist to whom we sent the original review-copy died before he had written the review.

PLATE I

CHALK FIGURE, GROTTE DE COIZARD, MARNE. (*See* p. 121)
Ph. Armand Viré

facing p. 120

PLATE II

STELE OF KHEILA (*See* p. 121)

adopt it in some degree—witness his two last groups (Groupe de Corse, 398–400, 486–7 ; groupe des statues étrangères, 400, 507–60). He seems to live in the old world of pure typology—a barren region long since evacuated by most students.

The illustrations are deplorably bad, but again are better than nothing. A study in black and white on p. 311 represents the well-known Coizard chalk-figure, though it looks like a lump of clay photographed in the dark. We reproduce here (PLATE I) M. Viré's admirable photograph of this important monument. (Perhaps some day the Marne rock-cut tombs will be planned and published !). We also reproduce (PLATE II) one of the interesting Maroccan stelas (one was published, equally obscurely, in the Report of the 15th Congress held in Portugal, 21–30 September 1930, also published by M. Nourry).[2] At the same time we may call attention to M. Vayson de Pradenne's article on ' La Stèle de l'Isle-sur-Sorgue (with its *excellent* photographs and drawings) published in the Compte Rendu de la X[e] Session du Congrès prèhistorique de France, 1931.[3] To the list of foreign examples may be added a statue-menhir at Hadji Hara in Soviet Armenia, near Mount Ararat, with head and breasts. There is a photograph of this in the Museum at Erivan, together with one of a ruder example. Megalithic phalli in the same district are still resorted to by women for purposes of supposed impregnation.[4]

We do not wish to conclude this review without expressing gratitude to the author for his attempt to synthesize and codify a vast group of facts. We are all the richer for it. Whatever may be said of its short-comings we shall use it continually in any researches concerned with the ritual of the megalithic cult. O.G.S.C.

ARCHAEOLOGIA ORIENTALIS, published by the Far Eastern Archaeological Society, Tokyo and Kyoto.

I. P'I-TZU-WO : Prehistoric Sites by the River Pi-liu-ho, S. Manchuria. *By* KOSAKU HAMADA, 40 *pp.* in English and German, 73 § in Japanese, 69 *pl.* (10 *coloured*), 47 *figures*, 1929.

II. MU-YANG-CH'ÊNG : Han and Pre-Han Sites at the Foot of Mt. Lao-t'ieh, S. Manchuria. *By* YOSHITO HARADA *and* K. KOMAI, 52 *pp.* in English, etc., 100 § in Japanese, 72 *pl.* (3 *coloured*), 45 *figures*, 1931.

III. NAN-SHAN-LI : Report on the Excavations of the Brick-tombs of the Han Dynasty at the Foot of Mt. Lao-t'ieh. *By* SADAHIKO SHIMADA *and* K. HAMADA, 65 *pp.* in English, 108 § in Japanese, 55 *pl.* (3 *coloured*), 62 *figures*, 1933.

Kwan-to, the southern extremity of the Liao-tung peninsula, containing Port Arthur and Dairen, has played a great part in the history of the last forty years : Japan tried to obtain it after her victory over China in 1894, Russia leased it in 1898 and Japan finally got the lease in 1905. In Korea the Japanese have done much for archaeology by their excavations, particularly in the Lo-lang district in the northwest

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[2] We are indebted to M. Benoit for these photographs, obtained through the kind offices of Mr W. J. Hemp, F.S.A.

[3] Imprimerie Ch. Monnoyer, 12 place des Jacobins, Le Mans. (We cannot give page references as all these separata unfortunately have separate pagination).

[4] An elaborate account of Abyssinian megaliths was published in 1931, the same year as this monograph (*Cinq. années de recherches en Ethiopie*, par R. P. Azais et R. Chambard, 2 vols., Paris, 350 francs) ; and reference may also be made to M. H. Neuville's articles in *L'Anthropologie*, 1928, XXXVIII, 255–88, 523–64 ; 1932, XLII, 497–523.

(see ANTIQUITY, 1931, v, p. 521), and Kei-sho (Kyŏng Dzhu) in the southeast, splendidly published by the Governor General's Administration.

They are doing similar work in Kwan-to, and it is being published by the recently founded Toa-kokogaku-kwai or Far Eastern Archaeological Society.

I. P'I-TZU-WO. Two sites near the coast at the extreme northeast of Kwan-to now left high and dry by the retirement of the sea, but once forming an island they have called Tan-t'o-tzu (single isle) and a little promontory named Kao-li-chai (Korean fort). The island was occupied first, mostly in neolithic times ; artifacts chiefly of blue-grey slate, celts rather like the shoe-last, crescent-shaped knives with two holes, a dagger 16 in. long, a few beads and spindle-whorls and bracelets of shell : most of the types familiar from Torii's work. The chief interest is in the pottery : A^1, monochrome ware, bowls, stands and globular pots ; A^2, the most easterly extension of painted pottery, less accomplished than Sha-kuo-t'un, but with an attractive step-pattern in red and yellow ochre and white slip ; A^3, black or buff ware more developed than A^1, found in an earthen grave. All this fits on to the culture described by C. W. Bishop, ANTIQUITY, 1933, VII, p. 389.

At Kao-li-chai there was no painted pottery but B ware, a more advanced monochrome, rare at Tan-t'o-tzu, showing very well the prototypes of the hollow-footed *Li* tripod, and the two-storeyed steamer *Yen*, familiar in Chinese bronze. It was succeeded by C, of a fine grey-like late Chou or early Han ware.

There was a little bronze, and iron things overlapping with the bronze and stone. This stage is dated by knife, spade and Early Han coins. Occupation ended about 100 B.C. The inhabitants were perhaps a Tungus tribe (Torii), or more probably early Chinese beginning their expansion towards north Korea and their cultural influence on Korea and Japan (Hamada).

II. MU-YANG-CH'ENG (Pasture sheep fort) is an oblong earthwork on the west slope of Mt. Lao-t'ieh, the projection of the peninsula southwest of Port Arthur. It yielded a few Stone-Age objects and then seals, antefixes and coins pointing to its having been an administrative centre under the Han. The pottery dated from late Chou to Han and is important as being used ware, not funerary. The chief interest is in the tombs of the neighbourhood, a new type in which the coffin was packed outside with shells or stones, a child's burial in an arrangement of three pots of quite different wares, and most curious, the first known example of a *chi-chou* grave ; by a practice ascribed to Chou times in the *Li-chi* the earth walls of the grave were turned into brick by lighting a fire in it. It yielded several bronzes, particularly a dagger handle of a queer shape like a laterally compressed mushroom with an inset like a dress-tie. This explains the hitherto unknown use of various bronze parts found in China and Japan and an excursus is devoted to these. An appendix describes an exactly similar earthwork in Shan-tung across the gulf.

III. NAN-SHAN-LI (S. Mountain to the left) is a western spur of Mt. Lao-t'ieh. Near it are many fine brick tombs of officials at Mu-yang-ch'êng in Han times. Each contained delightful model houses, stoves and animals in pottery, vases also and toilet boxes and some boxes in lacquer. These are interesting because such tombs have rarely been properly excavated in China, though they do not compare with the finds at Lo-lang. But the buildings are really the main thing, mostly two chambers with corbelled vaults, but one dug by Hamada in 1912 with no less than five. The bricks are patterned and even painted in bright colours—a novelty.

Each volume contains an appendix in German dealing fully with the human

remains, which appear to be of the Chinese type, approximating as they get later to that of the present day. The three folios are magnificently produced : in NAN-SHAN-LI each tomb-group is figured as a whole and then the objects given separately on the plates, a very good arrangement. The maps are a little hard for the westerner as the lettering is all in Japanese, but the English summaries and descriptions of the plates are sufficient.

ELLIS H. MINNS.

DAS URZEITLICHE BERGBAUGEBIET VON MÜHLBACH-BISCHOFSHOFEN. *By* KARL ZSCHOCKE *and* ERNST PREUSCHEN. *Published by the Anthropologische Gesellschaft in Wien*, (1, *Burgring* 7), 1932. *pp.* IX, 287, 6 *maps*, 28 *plates and* 19 *text-figs. Price not stated.*

The district with which this imposing monograph deals comprises a strip of land in the Province of Salzburg stretching in an easterly direction between Mühlbach and Bischofshofen for a distance of about 20 kilometres, with a breadth of ten. The country is mountainous and highly mineralized. Evidences of early working are to be found in funnel-shaped depressions in the ground, trenches often extending to some hundreds of metres, ore-sorting stations and smelting sites.

Characteristic remains associated with the sites are comparatively few, as the sites of the homes of the miners still await discovery. The chronology of the remains is dealt with in a series of supplementary reports (pp. 153–85). No definite period can at present be assigned to them, but provisionally they may be said to belong to the early Bronze Age period and to have persisted to the end of that period, or even later. Following a general topographical description of the sites, we are given on pp. 25–39 a novel and striking disquisition on the application of fire-setting by the 'Old Men' to rock removal. It is surprising to hear that this ancient method can, under certain conditions, compete with the use of modern mining explosives. The ancient methods of breaking down the hard rock by fire will be best understood by referring to the four plates which follow maps I-VI. Here only an imperfect outline of the process can be given.

Fire-setting is effective only when the heat of the flame of the burning pile can be directed against the face of the rock to be removed. In the initial stage of mining carried out on a single floor, fire-setting produces little result. As the work is advanced and the ceiling heightened the floor is divided—one portion following the principal vein. The other is timbered and roofed for the protection of the workers and the waste rock is piled against it. Air now passes from the lower to the upper floor and fire-setting yields better results. On the lower floor drainage-water is collected and dammed. The water is partly utilized at a stamping-station placed on the further side of the dam. The remainder is carried by hand-labour to the surface. This thesis is based partly on observed facts and partly upon conjecture—but the writers seem confident of its substantial accuracy. For the present it seems advisable to regard their thesis as provisional only—for other solutions appear to be compatible with their data.

The following chapter deals with the prehistoric methods of copper extraction. A very clear and useful account is given of the rationale of copper smelting prior to the introduction of the electrolytic methods. The writers give their reasons for the non-acceptance of the single-smelting theory of Kyrle. According to their view the ore was twice roasted and twice smelted—the final product being marketed in round cakes

and refined elsewhere. They also note that smelting was probably to some extent carried out in crucibles ; for fragments of pottery found on the sites have been shown to contain appreciable quantities of copper slag, and the shape of these fragments militates against the idea that the vessels were made for domestic uses. The writers admit that their conclusions are based principally upon the result of slag analysis. If the four operations are accepted as the minimum number in theory the thesis may be accepted. It is, however, probable that in practice the old copper-smelters blundered as frequently as their successors, and that there was a good deal of unnecessary duplication of work. For instance, in 1582 Joachim Gaunse stated that he could ' make copper and copper stone by once roasting and once smelting ' whereas the patentees of the Mines Royal could only do it with sixteen roastings. Gaunse proposed to lixiviate the roasted ore, as vitriol was then a profitable side-line—but he also alleged that the process of washing the ore ' causeth it sooner to melt '*. Lixiviation would have assisted the operations of the Salzburg smelters, and as their piles of ore were stacked in the open probably much of the soluble metallic sulphates was removed by rainfall. Subsequent chapters deal with the location and duration of the mining settlements. The supplementary matter has already been referred to and it only remains for the present writer to congratulate Herren K. Zschocke and E. Preuschen upon the satisfactory treatment of their material. The work is well printed and illustrated. From a publisher's standpoint, however, it may be suggested that the address should be stated on the title-page, that the price of the publication should be given in slip form or otherwise, and that a full collation should be given of the preceding monographs whether in print or not. Further, a word of caution is advisable to intending purchasers of this work. Before attempting to master its contents they would do well to study with care the ' Verzeichnis und Erklärung der Fachausdrucke ', pp. 265–83.

E. W. HULME.

MASADA : DIE BURG DES HERODES UND DIE RÖMISCHEN LAGER mit einem Anhang : Beth-Ter. *By* ADOLF SCHULTEN. (*Sonderdruck aus Zeitschrift des Deutschen Palästina-Vereins ;* Band 56). *Leipzig, J. C. Hinrich,* 1933. *pp.* 184, 14 *plates and* 28 *maps and plans.* 15 *marks.*

The rock of Sebbe or Masada forms a high isolated plateau 2080 feet long by 1050 feet broad. From the top of its precipitous sides the Dead Sea can be seen lying far below on the east. On the northwest and southeast are the deep gorges of the Wad-el-Hâfâf and the Wad-es-Seyal, divided by a rocky saddle, and beyond lie the waterless crags of the Waste of Judea.

The story of the grim tragedy which will always be associated with the site is told by Josephus—the occupation of Masada by Eleazar and his sicarii, altogether some 960 men, women and children, the investment of the rock by the Roman troops under L. Flavius Silva, the building of the great mound on the west, the breach in the defences made by the battering ram, and the self-immolation of the garrison. There is probably no site that presents so clearly the *mise-en-scène* of a great tragedy of the ancient world.

On the summit of the plateau are the remains of the buildings that housed the garrison, the store houses, the cisterns, the defences. Down below the lines of the

* Grant-Francis, *Smelting of Copper in the Swansea District,* p. 26.

circumvallation can be clearly followed. On the flatter land sloping towards the Dead Sea the wall is set at intervals with towers. On the north, west and south it crosses deep ravines, and climbs to the summit of lofty cliffs standing almost on a level with the fortress. On the line of the wall, but a short distance behind it, are the two largest camps, B and F, each containing a superficial area of about five acres, which must have held Silva's legionaries. In addition to these there are six much smaller camps, which were probably garrisoned by auxiliary troops. The great mound rises from the saddle on the west, and near its base is the enclosure where the material for the attack was assembled.

To the examination of the site, Professor Schulten and his colleagues devoted four weeks. While he reproduces plans of the buildings which are still to be seen on the summit, his work has been chiefly devoted to the study and planning of the Roman military works, and, in particular, the camps both legionary and auxiliary, which he has examined with a completeness which has never been attempted before.

The camps, for they were essentially laid out for temporary occupation, differ widely from the forts with which we are familiar in Britain or in Germany. The element of permanency suggested by the central principia, the granaries, the bath houses, are wanting, and yet the remoteness of the site has secured for its drystone constructions a permanence which cannot be matched in the west. The plans present a picture of the layout of the camps of a force on active service. There are no inscriptions available to aid us in identifying the various elements which composed Silva's army. We know that the Xth Legion Fretensis took part in the siege, and the legionaries must have occupied the two larger camps B and F ; the first of these being probably the headquarters while the circumvallation was in progress, the second when the construction of the mound was bringing the siege to a conclusion.

Professor Schulten has worked out from the existing remains, aided by the text of Hyginus and other sources, that the military force present and quartered in the eight camps numbered about 8000 men. In addition to the fighting strength he estimates that 2000 non-combatants would be required to bring water and stores to the army. The superficial area of the eight camps is the equivalent of about $13\frac{3}{4}$ English acres. The area is astonishingly small when we consider that at Caerleon, York, or Chester, the legion occupied about 50 acres, while for an auxiliary cohort 1000 strong, such as the Tungrian garrison of Housesteads, $4\frac{1}{2}$ acres were allowed. If Professor Schulten's estimates are correct, the men must, to use his own words, have been packed like sardines.

An interesting problem centres round the camp F, which from the presence of canabae gives evidence of more intensive occupation than any of the others ; within the camp, and occupying one of its angles, there has been inserted a smaller and much more strongly fortified redoubt F.2. Von Domaszewski interpreted this as a place of deposit of the siege material. Mr Hawkes regards it as having been fortified to house the garrison left behind after the siege. Professor Schulten sees in it a construction dating from the Diocletian period, and cites as a parallel late Roman forts such as Alzei and others. The plan does not seem to support this view. The gates of the original camp F were each provided with a clavicula. When the more strongly fortified area was cut off from it a new gate was provided in the east wall, and this also was protected by a clavicula. The clavicula was an early feature which had disappeared in the forts of the late third and fourth century ; its presence seems to prove that in point of time the construction of the redoubt cannot be much later than the camp.

The presence of towers on the wall is not necessarily a late feature, but the towers of the forts of the fourth century, as at Alzei, differ from those of the Flavian and Antonine forts in their projecting outwards from the wall.

The series of plans of the forts and of the mound, as well as the general map showing the whole circumvallation, will be welcomed by all students of Roman military operations. A series of air-photographs is also reproduced, but compressed into smaller space they are less effective than those which were recently published by Mr Hawkes in ANTIQUITY (March 1931, pp. 60-97). JAMES CURLE.

ADAM'S ANCESTORS. *By* L. S. B. LEAKEY. *Methuen*, 1934. *pp.* XIX, 244, *with* 30 *text-figures and* 12 *plates.* *7s 6d.*

The atom is no longer solid, the Old Stone Age no longer simple, whilst Mousterian man himself begins to look lamentably synthetic. Dr Leakey, thinking over his adventures in East African prehistory, and correlating with these a wider survey of the Pleistocene field, gives full value to his readers, who should be numerous. He is not the only one who is engaged in complicating our simplicities, and even the most cautious student will bear him no grudge for exercising his well-earned right to have his say—particularly since he says it with an air of conviction that is often infectious. In expressing conclusions based on the results of recent work in East Africa, Egypt, Palestine, China, and various parts of Europe, he has shown a boldness which is not, or is not regrettably, dogmatic, and if at times the evidence is insufficient to convert, it is usually strong enough to support his theses, provisionally. In any case, archaeology is a fascinating jig-saw puzzle, with so many missing pieces that those which come to hand, mutilated and discoloured, must often be laid down in the wide open spaces. One guesses, much or a little, and certainties emerge in course of time.

Dr Leakey writes in clear and simple language, and though the ' general reader ' will sometimes find himself beyond his depth—as he should expect—the book will be welcomed not only by many whose interest in the subject calls for tender treatment, but by those whose faith is tempered by experience. His illustrations range from adequate to excellent, the latter predominating. His discussions of discoveries and theories which have not yet got into general circulation in this country are of especial interest, even though at times one must wish that the proportions of the book had allowed him to offer us a wider choice of hypothesis or theory.

Only a few of the more important aspects of the book can be touched upon here. Amongst the most significant, as marking tendencies that have of late become conspicuous, are the emphasis laid upon the contemporary development of various Pleistocene cultures, often with interaction between them ; the primary distinction drawn between ' flake-cultures ' and ' core-cultures ' ; and the recognition of a number of successive stages of development in cultures (such as the Clactonian and the Levalloisean) which a few years ago had scarcely established their footing. By extending the Pleistocene downwards—as others have done—Dr Leakey brings all the lower (' eolithic ') cultures within this period, with the Kentish type as the earliest. The other three East Anglian ' cultures ' he regards as contemporary with each other, two of them persisting into Günz glacial times. With the Günz-Mindel interglacial we get Chellean I and Cromerian, the former passing into Chellean II just before the Mindel glacial, and so to Acheulean in the Mindel-Riss interglacial. By the time of Würm I, the Acheulean has reached its stage VII, or Micoquian. The Cromerian gave rise to the Clactonian, which

passed through stages I to III (High-Lodge culture) during the Mindel-Riss, and in turn gave rise (in France) to the Tayacian, about the time of Würm I; out of this developed the true Mousterian, which flourished between Würm I and II, but which is regarded as rather a restricted culture, by no means so important or so widely-spread as was formerly supposed, and is perhaps not represented in England. The Levalloisean, on the other hand, beginning with a ' proto ' stage in the Mindel-Riss, reached its stage VII soon after Würm I, and the result of its influence on the late Acheulean was the Lower Aurignacian, perhaps in part in continuity with a basal Aurignacian of the Riss-Würm.

It will be seen that Dr Leakey is not afraid of shocking the old school—or even the new, in so far as this has not become immune—by dint of controversy.

Of ' Adam's Ancestors ' themselves, and of their nearer relations, Dr Leakey has much to say that is important for our genealogy. Basing his decisions to a large extent upon his own East African discoveries (Kanam and Kanjera skull fragments) he assigns to *Homo sapiens* the Chellean and Acheulean cultures—as well as, of course, those from the Aurignacian onwards—whereas the earlier flake-cultures, Clactonian, Levalloisean, and Mousterian, he attributes to what we may call Neandertaloids, which, incidentally, he groups in the genus *Palaeoanthropus*. Our so-called Mousterian or Neandertal man he regards as an artificial or composite species, since the Mousterian culture has had assigned to it much that in reality belongs to the other two early flake-cultures, and since, therefore, not all the human remains that have been called Mousterian are entitled to the name, allied to Neandertal man though they surely are.

The book is so provocative of discussion that discussion is impracticable within the limits of a brief review. It is not all new, but it is new enough. One would like to believe it all, and so perhaps outstrip the author, but it must be sufficient to admire the picture he has put together, and to give some idea of its general character. The reader is referred to the book itself for Dr Leakey's expert treatment of flint fracture, of methods of working and using stone and bone, and for other conclusions concerning early human types, drawn from his own work in East Africa, as well as from recent discoveries in Palestine and China. Whatever our reservations—and he would be astonished if they were not many—we must congratulate him on the production of a ' popular ' book which is learned and ingenious in its reconstruction of the prehistoric past, and fertile in suggestions for the prehistorian's future. H. S. HARRISON.

HABITAT, ECONOMY AND SOCIETY : a geographical introduction to Ethnology. *By* C. DARYLL FORDE. *Methuen*, 1934. *pp.* XIV, 499, *with* 109 *illustrations and maps.* 15*s.*

A generation of English geographers, intoxicated by the doctrines of Ratzel and Le Play, so simply and seductively presented to them by the genius of the late Professor Herbertson, proceeded to ' explain ' man and his work in terms of environment. Historians, anthropologists and archaeologists who turned aside to rebuke these enthusiasts discovered unexpectedly a geography that compelled attention. Hence that growing awareness and appreciation of the geographical factor which informs and vivifies, for example, the earlier chapters of Professor Trevelyan's *History of England*, and gives its very texture to Sir Cyril Fox's *Personality of Britain*. University students of ethnology and geography are thus well disposed for that mutual introduction which Professor Ford's book is designed to effect. Doubtless it was in his mind that a strong dose of anthropology was the best cure for Geographical Determinism, but he was also aware

that the meagre and perfunctory description of habitat in current works of anthropology was a symptom of a deficiency disease.

The plan of his book is simple. Peoples of a relatively low cultural level are roughly classified according to their fundamental economy as food gatherers, cultivators and pastoral nomads. Examples of each class are described as they occur in four of five strongly contrasting geographical regions. Thus the student is immediately disabused of the notion that there is a necessary genetic relation between type of region and mode of life. Food gatherers are found from equator to pole ; cultivators make use of digging stick, hoe or plough ; pastoralists herd a wide variety of animals, from camel to reindeer. Careful objective accounts of over a score of specific human groups, divorced from any attempt to theorize about them, bring out the diversities of ideas, of aptitudes, of social and cultural inheritance which intervene between man and his habitat. But an excellent series of specially prepared maps and line drawings (from photographs) keeps the student in mind that between man and his habitat a relationship, although not necessarily a causal one, must always exist. The amount of detail necessary to the descriptive sections (more than three-quarters of the whole) makes them rather heavy reading, but each chapter is self-contained, and can be studied separately.

In part IV are to be found the guarded conclusions which can be drawn from a review of the objective studies, followed by an account (which will be peculiarly welcome to geography students) of the most acceptable views on the origin of cultivated plants and the domestication of animals. In the concluding chapter, Professor Forde points out that ' broad general classifications of climatic or vegetational regions are quite inadequate for the analysis of cultural possibilities . . . Between any two broadly similar regions, the contrasts in detail in the precise conditions that are effective in the culture . . . outweigh the significance of any generalization concerning them all '. It is here that recent advances in geography will be of service to the anthropologist, for the broad categories of major regions being fixed, attention is now being focused on the ' precise conditions ' of the individual area, and a technique of landscape description has been devised which should form part of the equipment of every traveller and field-worker. From this point of view it is a pity that the author did not include Professor S. Passarge's *Beschriebende Landschaftkunde* in the otherwise admirable bibliography which is appended for the further guidance of students.

A word of praise is due to the pleasing line-drawings which are always truly illustrative. The artist, Mr Anthony Brown, was for some time resident in West Africa, and it is clear that his contact with native peoples and cultures there has enabled him to grasp exactly what the ethnologist requires. This is a book which lately has been consciously needed ; and a serious gap in the student's library has now been admirably filled.

E. G. R. TAYLOR.

THE SO-CALLED SHEIKH-EL-BELED
Cairo Museum
(*See* ANTIQUITY, March 1935, p. 14)

facing p. 129